



HUMAN TELOMERASE

ATGCCGCGCGCTCCCCGCTGCCGAGCCGTGCGCTCCCTGCTGCGCAGCCACTACCGCGAG	60
MetProArgAlaProArgCysArgAlaValArgSerLeuLeuArgSerHisTyrArgGlu	20
GTGCTGCCGCTGGCCACGTTTCGTGCGGCGCCTGGGGCCCCAGGGCTGGCGGCTGGTGCAG	120
ValLeuProLeuAlaThrPheValArgArgLeuGlyProGlnGlyTrpArgLeuValGln	40
CGCGGGGACCCGGCGGCTTTCGCGCGCTGGTGGCCCAGTGCCTGGTGTGCGTGCCCTGG	180
ArgGlyAspProAlaAlaPheArgAlaLeuValAlaGlnCysLeuValCysValProTrp	60
GACGCACGGCCGCCCCCGCGCCCCCTCCTTCGCCAGGTGTCCTGCCTGAAGGAGCTG	240
AspAlaArgProProProAlaAlaProSerPheArgGlnValSerCysLeuLysGluLeu	80
GTGGCCCGAGTGCTGCAGAGGCTGTGCGAGCGCGGCGGAAGAACGTGCTGGCCTTCGGC	300
ValAlaArgValLeuGlnArgLeuCysGluArgGlyAlaLysAsnValLeuAlaPheGly	100
TTCGCGCTGCTGGACGGGGCCCGGGGGCCCCCGAGGCCTTCACCACCAGCGTGCGC	360
PheAlaLeuLeuAspGlyAlaArgGlyGlyProProGluAlaPheThrThrSerValArg	120
AGCTACCTGCCCAACACGGTGACCGACGCACTGCGGGGGAGCGGGGCGTGGGGGCTGCTG	420
SerTyrLeuProAsnThrValThrAspAlaLeuArgGlySerGlyAlaTrpGlyLeuLeu	140
TTGCGCCGCGTGGGCGACGACGTGCTGGTTACCTGCTGGCACGCTGCGCGCTCTTTGTG	480
LeuArgArgValGlyAspAspValLeuValHisLeuLeuAlaArgCysAlaLeuPheVal	160
CTGGTGGCTCCCAGCTGCGCCTACCAGGTGTGCGGGCCCGCTGTACCAGCTCGGCGCT	540
LeuValAlaProSerCysAlaTyrGlnValCysGlyProProLeuTyrGlnLeuGlyAla	180
GCCACTCAGGCCCGGCCCCGCCACACGCTAGTGGACCCCGAAGGCGTCTGGGATGCGAA	600
AlaThrGlnAlaArgProProProHisAlaSerGlyProArgArgArgLeuGlyCysGlu	200
CGGGCCTGGAACCATAGCGTCAGGGAGGCCGGGTCCCCCTGGGCCTGCCAGCCCCGGT	660
ArgAlaTrpAsnHisSerValArgGluAlaGlyValProLeuGlyLeuProAlaProGly	220
GCGAGGAGGCGGGGGCAGTGCCAGCCGAAGTCTGCCGTTGCCAAGAGGCCAGGCGT	720
AlaArgArgArgGlyGlySerAlaSerArgSerLeuProLeuProLysArgProArgArg	240

Fig. 1A



GGCGCTGCCCCTGAGCCGGAGCGGACGCCCGTTGGGCAGGGGTCTGGGCCCACCCGGGC 780
GlyAlaAlaProGluProGluArgThrProValGlyGlnGlySerTrpAlaHisProGly 260

AGGACGCGTGACCGAGTGACCGTGGTTTCTGTGTGGTGTACCTGCCAGACCCGCCGAA 840
ArgThrArgGlyProSerAspArgGlyPheCysValValSerProAlaArgProAlaGlu 280

GAAGCCACCTCTTTGGAGGGTGGCGTCTCTGGCACGCGCCACTCCCACCCATCCGTGGGC 900
GluAlaThrSerLeuGluGlyAlaLeuSerGlyThrArgHisSerHisProSerValGly 300

CGCCAGCACCACGCGGGCCCCCATCCACATCGCGGCCACCACGTCCCTGGGACACGCCT 960
ArgGlnHisHisAlaGlyProProSerThrSerArgProProArgProTrpAspThrPro 320

TGTCCCCCGGTGTACGCCGAGACCAAGCACTTCTCTACTCCTCAGGCGACAAGGAGCAG 1020
CysProProValTyrAlaGluThrLysHisPheLeuTyrSerSerGlyAspLysGluGln 340

CTGCGGCCCTCCTTCTACTCAGCTCTCTGAGGCCCAGCCTGACTGGCGCTCGGAGGCTC 1080
LeuArgProSerPheLeuLeuSerSerLeuArgProSerLeuThrGlyAlaArgArgLeu 360

GTGGAGACCATCTTTCTGGGTTCCAGGCCCTGGATGCCAGGGACTCCCCGAGGTTGCCC 1140
ValGluThrIlePheLeuGlySerArgProTrpMetProGlyThrProArgArgLeuPro 380

CGCCTGCCCCAGCGCTACTGGCAAATGCGGCCCTGTTTCTGGAGCTGCTTGGGAACCAC 1200
ArgLeuProGlnArgTyrTrpGlnMetArgProLeuPheLeuGluLeuLeuGlyAsnHis 400

GCGCAGTGCCCTACGGGGTGCTCCTCAAGACGCACTGCCCGCTGCGAGCTGCGGTCACC 1260
AlaGlnCysProTyrGlyValLeuLeuLysThrHisCysProLeuArgAlaAlaValThr 420

CCAGCAGCCGGTGTCTGTGCCCGGAGAAGCCCCAGGGCTCTGTGGCGGCCCCGAGGAG 1320
ProAlaAlaGlyValCysAlaArgGluLysProGlnGlySerValAlaAlaProGluGlu 440

GAGGACACAGACCCCGTCGCCTGGTGCAGCTGCTCCGCCAGCACAGACCCCTGGCAG 1380
GluAspThrAspProArgArgLeuValGlnLeuLeuArgGlnHisSerSerProTrpGln 460

GTGTACGGCTTCGTGCGGGCCTGCCTGCGCCGGCTGGTGGCCCCAGGCCTCTGGGGCTCC 1440
ValTyrGlyPheValArgAlaCysLeuArgArgLeuValProProGlyLeuTrpGlySer 480

AGGCACAACGAACGCCGCTTCTCAGGAACACCAAGAAGTTCATCTCCCTGGGGAAGCAT 1500
ArgHisAsnGluArgArgPheLeuArgAsnThrLysLysPheIleSerLeuGlyLysHis 500

Fig. 1B



CCAAGCTCTCGCTGCAGGAGCTGACGTGGAAGATGAGCGTGCGGGGCTGCGCTTGGCTG 1560
AlaLysLeuSerLeuGlnGluLeuThrTrpLysMetSerValArgAspCysAlaTrpLeu 520

CGCAGGAGCCCAGGGGTGGCTGTGTTCGGCCGCAGAGCACCGTCTGCGTGAGGAGATC 1620
ArgArgSerProGlyValGlyCysValProAlaAlaGluHisArgLeuArgGluGluIle 540

CTGGCCAAGTTCCTGCACTGGCTGATGAGTGTGTACGTGCTCGAGCTGCTCAGGTCTTTC 1680
LeuAlaLysPheLeuHisTrpLeuMetSerValTyrValValGluLeuLeuArgSerPhe 560

TTTTATGTACGGAGACCAGTTCAAAAGAACAGGCTCTTTTTCTACCGAAGAGTGTC 1740
PheTyrValThrGluThrThrPheGlnLysAsnArgLeuPhePheTyrArgLysSerVal 580

TGGAGCAAGTTGCAAAGCATTGGAATCAGACAGCACTGAAGAGGGTGCACTGCGGGAG 1800
TrpSerLysLeuGlnSerIleGlyIleArgGlnHisLeuLysArgValGlnLeuArgGlu 600

CTGTCCGAAGCAGAGGTCAGGCAGCATCGGGAAGCCAGGCCCGCCCTGCTGACGTCCAGA 1860
LeuSerGluAlaGluValArgGlnHisArgGluAlaArgProAlaLeuLeuThrSerArg 620

CTCCGCTTCATCCCAAGCCTGACGGGCTGCGGCCGATTGTGAACATGGACTACGTGCTG 1920
LeuArgPheIleProLysProAspGlyLeuArgProIleValAsnMetAspTyrValVal 640

GGAGCCAGAACGTTCCGCAGAGAAAAGAGGGCCGAGCGTCTCACCTCGAGGGTGAAGGCA 1980
GlyAlaArgThrPheArgArgGluLysArgAlaGluArgLeuThrSerArgValLysAla 660

CTGTTACGCGTGCTCAACTACGAGCGGGCGCGGCCCGCCCTCCTGGGCGCCTCTGTG 2040
LeuPheSerValLeuAsnTyrGluArgAlaArgArgProGlyLeuLeuGlyAlaSerVal 680

CTGGGCTGGACGATATCCACAGGGCCTGGCGCACCTTCGTGCTGCGTGTGCGGGCCCAG 2100
LeuGlyLeuAspAspIleHisArgAlaTrpArgThrPheValLeuArgValArgAlaGln 700

GACCCGCCGCTGAGCTGTACTTTGTCAAGGTGGATGTGACGGGCGCGTACGACACCATC 2160
AspProProProGluLeuTyrPheValLysValAspValThrGlyAlaTyrAspThrIle 720

CCCCAGGACAGGCTCACGGAGGTCATGCCAGCATCATCAAACCCAGAACACGTACTION 2220
ProGlnAspArgLeuThrGluValIleAlaSerIleIleLysProGlnAsnThrTyrCys 740

GTGCGTCGGTATGCCGTGGTCCAGAAGGCCGCCCATGGGCACGTCCGCAAGGCCCTCAAG 2280
ValArgArgTyrAlaValValGlnLysAlaAlaHisGlyHisValArgLysAlaPheLys 760

Fig. 1C



AGCCACGTCTCTACCTTGACAGACCTCCAGCCGTACATGCGACAGTTCGTGGCTCACCTG 2340
SerHisValSerThrLeuThrAspLeuGlnProTyrMetArgGlnPheValAlaHisLeu 780

CAGGAGACCAGCCCGCTGAGGGATGCCGTCGTCATCGAGCAGAGCTCCTCCCTGAATGAG 2400
GlnGluThrSerProLeuArgAspAlaValValIleGluGlnSerSerSerLeuAsnGlu 800

GCCAGCAGTGGCCTCTTCGACGTCTTCCTACGCTTCATGTGCCACCACGCCGTGCGCATC 2460
AlaSerSerGlyLeuPheAspValPheLeuArgPheMetCysHisHisAlaValArgIle 820

AGGGGCAAGTCCTACGTCCAGTGCCAGGGGATCCCGCAGGGCTCCATCCTCTCCACGCTG 2520
ArgGlyLysSerTyrValGlnCysGlnGlyIleProGlnGlySerIleLeuSerThrLeu 840

CTCTGCAGCCTGTGCTACGGCGACATGGAGAACAAGCTGTTTGCGGGGATTCGGCGGGAC 2580
LeuCysSerLeuCysTyrGlyAspMetGluAsnLysLeuPheAlaGlyIleArgArgAsp 860

GGGCTGCTCCTGCGTTTGGTGGATGATTTCTTGTTGGTGACACCTCACCTCACCCACGCG 2640
GlyLeuLeuLeuArgLeuValAspAspPheLeuLeuValThrProHisLeuThrHisAla 880

AAACCTTCCTCAGGACCCTGGTCCGAGGTGTCCCTGAGTATGGCTGCGTGGTGAACCTTG 2700
LysThrPheLeuArgThrLeuValArgGlyValProGluTyrGlyCysValValAsnLeu 900

CGGAAGACAGTGGTGAACCTCCCTGTAGAAGACGAGGCCCTGGGTGGCACGGCTTTTGTT 2760
ArgLysThrValValAsnPheProValGluAspGluAlaLeuGlyGlyThrAlaPheVal 920

CAGATGCCGGCCCCACGGCCTATTCCTGGTGCGGCCTGCTGCTGGATACCCGGACCCTG 2820
GlnMetProAlaHisGlyLeuPheProTrpCysGlyLeuLeuLeuAspThrArgThrLeu 940

GAGGTGCAGAGCGACTACTCCAGCTATGCCCGGACCTCCATCAGAGCCAGTCTCACCTTC 2880
GluValGlnSerAspTyrSerSerTyrAlaArgThrSerIleArgAlaSerLeuThrPhe 960

AACCGCGGCTTCAAGGCTGGGAGGAACATGCGTCGCAAACCTTTGGGGTCTTGCGGCTG 2940
AsnArgGlyPheLysAlaGlyArgAsnMetArgArgLysLeuPheGlyValLeuArgLeu 980

AAGTGTACAGCCTGTTTCTGGATTTGCAGGTGAACAGCCTCCAGACGGTGTGCACCAAC 3000
LysCysHisSerLeuPheLeuAspLeuGlnValAsnSerLeuGlnThrValCysThrAsn 1000

ATCTACAAGATCCTCCTGCTGCAGGCGTACAGGTTTCACGCATGTGTGCTGCAGCTCCCA 3060
IleTyrLysIleLeuLeuLeuGlnAlaTyrArgPheHisAlaCysValLeuGlnLeuPro 1020

Fig. 1D



TTTCATCAGCAAGTTTGAAGAACCCACATTTTCTGCGCGTCATCTCTGACACGGCC	3120
PheHisGlnGlnValTrpLysAsnProThrPhePheLeuArgValIleSerAspThrAls	1040
TCCCTCTGCTACTCCATCCTGAAAGCCAAGAACGCAGGGATGTCGCTGGGGGCCAAGGGC	3180
SerLeuCysTyrSerIleLeuLysAlaLysAsnAlaGlyMetSerLeuGlyAlaLysGly	1060
GCCGCCGGCCCTCTGCCCTCCGAGGCCGTGCAGTGGCTGTGCCACCAAGCATTCTGCTC	3240
AlaAlaGlyProLeuProSerGluAlaValGlnTrpLeuCysHisGlnAlaPheLeuLeu	1080
AAGCTGACTCGACACCGTGTACCTACGTGCCACTCCTGGGGTCACTCAGGACAGCCCAG	3300
LysLeuThrArgHisArgValThrTyrValProLeuLeuGlySerLeuArgThrAlaGln	1100
ACGCAGCTGAGTCGGAAGCTCCCGGGGACGACGCTGACTGCCCTGGAGGCCGAGCCAAC	3360
ThrGlnLeuSerArgLysLeuProGlyThrThrLeuThrAlaLeuGluAlaAlaAlaAsn	1120
CCGGCACTGCCCTCAGACTTCAAGACCATCCTGGACTgatggccacccgcccacagccag	3420
ProAlaLeuProSerAspPheLysThrIleLeuAsp	1132
Gccgagagcagacaccagcagccctgtcacgccgggctctacgtcccagggagggagggg	3480
Cggccacacccaggcccgaccgctgggagctctgaggcctgagtgagtgtttggccgag	3540
gcctgcatgtccggctgaaggctgagtgtccggctgaggcctgagcgagtgtccagccaa	3600
gggctgagtgtccagcacacctgccgtcttcacttccccacaggctggcgctcggtcca	3660
ccccagggccagcttttcctcaccaggagcccggttccactccccacataggaatagtc	3720
catccccagattcgccattgttcacccctcgccctgccctcctttgccttccacccccac	3780
catccaggtggagaccctgagaaggaccctgggagctctgggaatttggagtgaccaaag	3840
gtgtgccctgtacacaggcgaggaccctgcacctggatgggggtccctgtgggtcaaat	3900
ggggggaggtgctgtgggagtaaaatactgaatatatgagttttcagttttgaaaaaaa	3960
aaaa	3964

Fig. 1E



Euplotes	1	-----MEVDVDNQADNHGIHSALKTCEEIKEAKTLYSWIQKVIRCR--NQSQSHYKDLEDIA
HT1	1	RRLGPGGWRLVQRGDPAAFRALVAQCLVCVPWDAR-PPPAAPSFQVSCLELVARVLQRLCERGAKNVLAFGFALLDGA
EST2	1	-----MKILFEFIQDKLDID--LQTNSTYKENLKCG
Euplotes	56	IFAQTNIVATPRDYNEEDFKVIARK-----EVFSTGLMIELIDKCLVELLSSSDVSDRQKLQCFGFQKGNQ-LAK
HT1	80	RGGPPEAFTTSVRSYLPNTVTDALRGSGAWGLLLRRVGDDVLVHLLARCALFVLVAPSCAY---QVCGPPLYQLGAATQA
EST2	30	HFNGLDEILT-TCFALPNSRKIALP-----CLPGDLSHKAVIDHCIIYLLTGELYNN---VLTFGYKIARNEDVNN
Euplotes	126	THLLTALSTQKQYFFQDEWVQVRAMIGNELFRHLYTKYLIFQRTSEGLVQFCGNNVFDHLKVNDKFDKKQKGGAAADMNE
HT1	157	PPPPHAGSPRRRLGCERAWNHSVREAGVPLGLPAPGARRRGGASRSLPLPKRPRRGAAPERTPVGQGSWAHPGRTRG
EST2	97	SLFCHSANVNVTLKGAAMKMFHSLVGTYAFVDLLINYTVIQFNGQ-FFTQIVGNRCNEPLPPKQVQRSSSS-----
Euplotes	206	PRCCSTCKYNVKNKEDHFLNNI-----NVPNNNMKSRTIRIFYCTHFNRNNQFF
HT1	237	PSDRGFCVVSAPRAFEATSLEGALSGTRHSHPSVGRQHAGPPSTSRPPRPWDTPCPVYAETKHFLYSSGDK--EQLR
EST2	169	----SATAAQIKQLTEPVTN-----KQFLHKLNI--SSSFF
Euplotes	255	KKHEFVSNKNNISAM-DRAQTIFTNI-----FRFNIRKKLKDVKIEKIAYMLEKVDFNFNYLTKSCPLPENWRE
HT1	315	PSFLLSLRPSLTGARLVETIFLGSRPWMPGTPRRLPRLPQRY-WQMRPLFELLGNHAQCPYGVLLKTHCPRAAVTP
EST2	200	PYSKILPSSSIKKLTDLREAIFP-----TNLVKIPQRLKVRINLTQKLLKRHKRLNYVSIINSICPPLEGT--
		Telomerase domain
Euplotes	326	RK-----QKIENLINKTREES--KYEEELFSYTTDNKCVTQFINEFFYNILPKDFLTGR-NRKNFQKKVKYVELNKH
HT1	394	AAGVCAREKPGGSVAAPEEEDTDPRLVQLLRQHSSPWQVYGFVRACLRRVPPGLWGSRHNERFLRNTKKFISLGKHA
EST2	268	-----VLDSLHSRQ-----SPKERVLFIIIVILQKLLPQEMFGSKKNKGKIKNLNLLLSPLNG
Euplotes	398	LIHKNLLEKINTREISWMOVET-SAKHFYFDHENIYVLWKLLRWIFEDLVVSLIRCCFFVTEQQKSYSKTYYYRKNIW
HT1	474	KLSLQELTWKMSVRDCAWLRRSPGVGCVPAAEHRLREEILAKFLHWLMSVYVVELLRSFFVYTETTFQKNRLFFYRKSVM
EST2	324	YLPFDSLKKLRKDFRWLFISD-IWFTKHNFENLN-QLAICFISWLFRLIPKIIQTFYCTEIS-STVTIVYFRHDTW
		Motif 1 Motif2
Euplotes	477	DVIMKMSIADLKK-ETLAEVQEKEVEEWKSL-GFAPGKLRLIPKKT--FRPIMTFNKKIVNSDRK--TTKLTNTNKL
HT1	554	SKLQSIGIRQHLKRVQLRELSEAEVRQHREARPAALLTSRLRFIPKPDG--LRPIVNM DYVVGARTFRREKRAERLTSRVK
EST2	401	NKLITPFIYEYFK-TYLVENNVCRNHNSTLS-NFNHSMRIIPKKSNNEFRIIAIPCRGADEEEFT--IYKENHKNAIQ

Fig. 2A



Motif A

Euplotes 551 NSHLMKTLKN-RMFKDPFGFAVFNYYDDVMKKYEEFVCKWKVQGQP-KLFFATMDIEKCYDSVNREKLSTFLKTTKLSS
HT1 632 ALFVSLNYERARR--PGLLGASVLGLDDIHRAWRTFVLRVRAQDPPPELYFVKVDVTGAYDTIPQDRLTEVIASIIKPN
EST2 477 PTQKILEYLRNKRPTSFTKIYSPTQIADRIKEFKQRLKKFNNVLP-ELYFMKFDVKSCYDSIPRMECMRILKDALKNEN

Euplotes 629 DFWIMTAQILKRKNVIDSKNFRKKEMKDYFRQKFQKIALEGGQYPTLFSVLENEQNDLNAKXTLIVEAK-GRNYFKND
HT1 710 TYCVRRYAVVQKAAGHVRKAFKSHVS-----TLTDLQPYMRQFVAHLQETSPLRDAVVIEQSSSLNEASSG
EST2 556 GFFVRSQYFFN-TNTGVCLKFNVVN-----A--SRVPKPYELYIDNVRTVHLSNQDVINVV-EMEIKT-

Motif B

Euplotes 708 NLLQPVINICQNYINFNGKFYKQTKGIPQGLCVSSILSSFYATLEESSLGFLRDESMNPENPNVNLMLRLTDDYLLIT
HT1 777 LFDVFLRFMCHHAVRIR-GKSYVQCQGIQGSILSTLLCSLCYGMEN---KLFAGIRRD-----GLLLRLVDDFLLVT
EST2 616 --ALWVEDKCYIR-----EDGLFQGSLSAPIVDLVYDDLLEFYSEFKASPSQD-----TLILKLADDFLIIS

Motif C

Motif D

Euplotes 788 TQENNAVLFIKLINVSRENGFKFMKKLQTSFPLSPSKFAKYGMDSVEEQNIQDYCDWIGISIDMKTLALMPNIWLRI
HT1 847 PHLTHAKTFLRTLVRGVPEYGCVVNLRKTVVNFVEDEALGG-TAFVQMPAHGLFPWCGLLLDTRTLEVSQDYSSYAR--
EST2 677 TDQQ-QVINIKKLAMG----GFQKYNAPANRDKILAVS-----SQSDDDTVIQFCAMHIFVKELEVWKSSTMW---

Motif E

Euplotes 868 EGILCTLNLMMQTKKASMWLKKKLKSLMNNITHYFRKTITTEDFANKTLNKLFISSGGYKYMQCAKEY--KDHFKKNLAM
HT1 924 TSIRASLTFRNGFKAGRNMRRLFGVLRKCHSLFLDLQVNSLQTVCTNIYKILLQAYRFHACVLQLPFHQQVWKNPTF
EST2 741 -----NFHIRSKSS----KGIFRSLIALFNTRISYKTIDTNLNSTNTVLMQIDHVKNISECYKSA--FKDLSINVTO

Euplotes 946 SSMIDLEVSKIISVTRAFFKYLVCNIKDTIFGEEHYDPFFLSTLKHFIETSTKKYIFNRVCMILKAKEAKLKSDQCQS
HT1 1004 FLRVISDTASLCYSILKAKNAGMSLGAKGAAGPLPSEAVQWLC-HQAFLLKLTRHRVTYVPLLSLRTAQTQLSRKLPGT
EST2 808 NMQFHSFLQRIIEMTVSG---CPITKCDPLIEYEV--FTI--LNGFLESLSNTSKF-KDNIILLRKEIQHLQAYIYI

Euplotes 1026 LIQYDA-----
HT1 1083 TLTALEAAANPALPSDFKTILD
EST2 879 YIHIVN-----

Fig. 2B

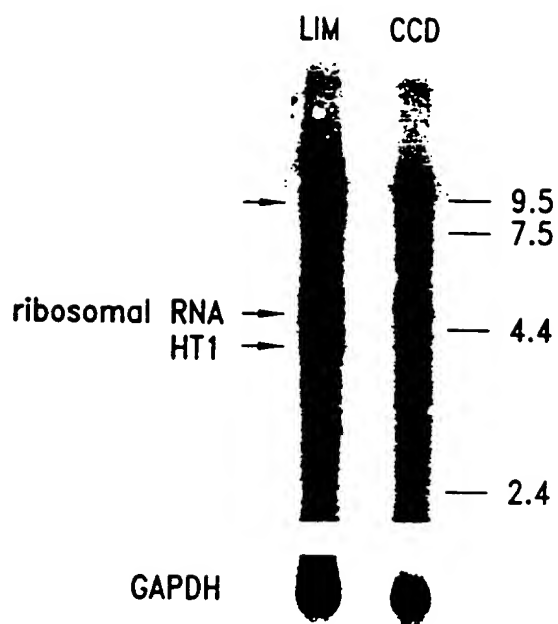


Fig. 3



Plasmid			Human blood					LIM1215				
10	5	1	H	E	P	X	B	H	E	P	X	B

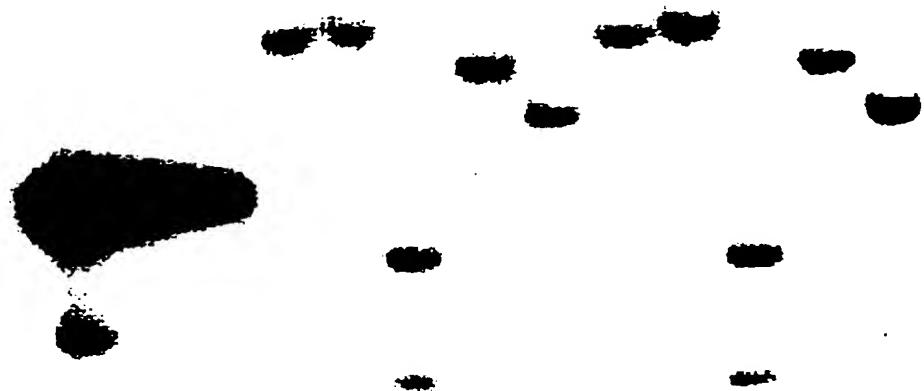


Fig. 4

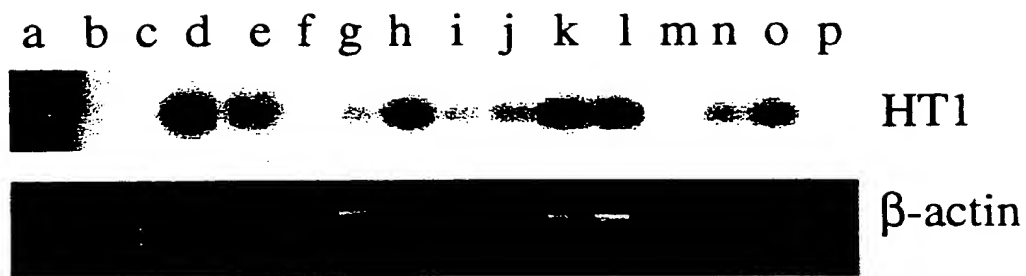


Fig. 5

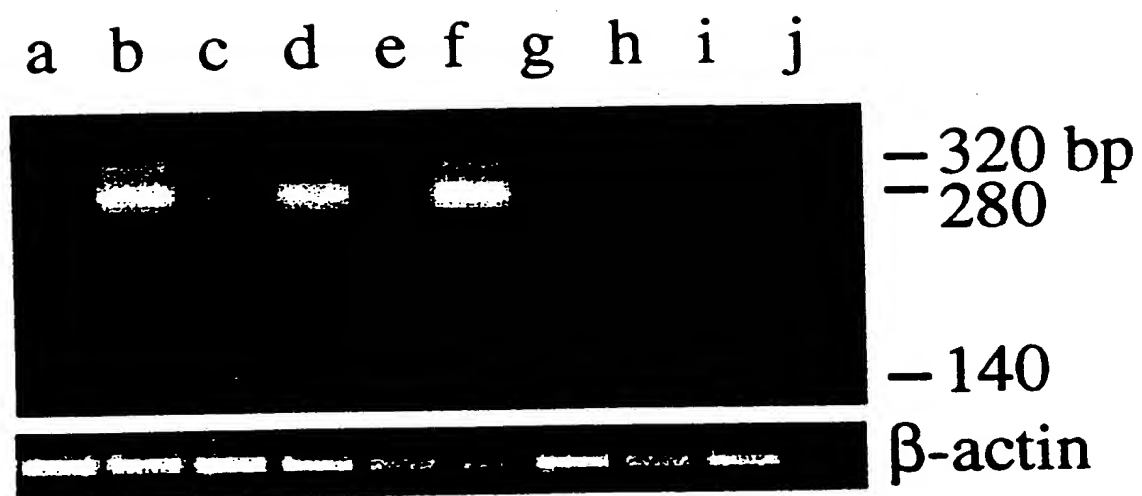


Fig. 6

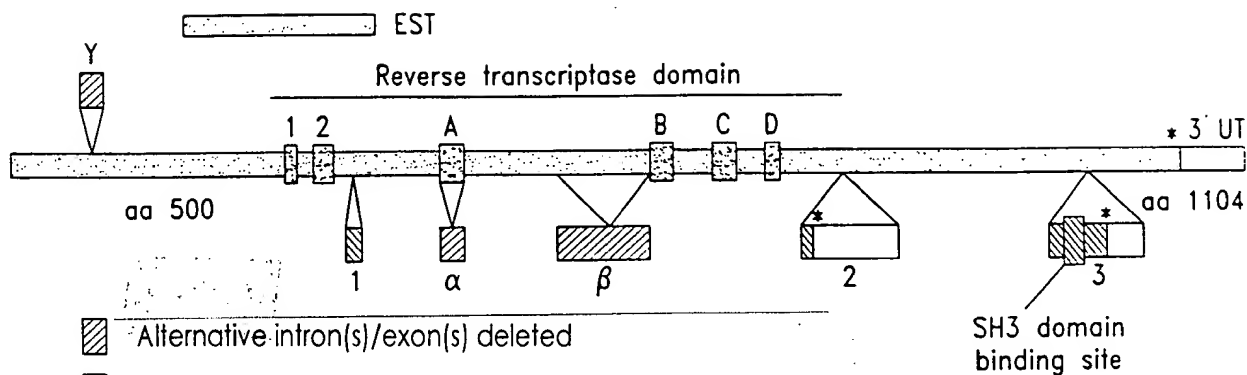


Fig. 7A

Variants:	1	α	β	2	3
RT-PCR product	NO	+	+	NO	+ & -
PCR from LIM1215 lib.	-	+	-	+	NO
RT-PCR product	NO	-	+	NO	+
53.2 cDNA	-	-	-	-	NO

Fig. 7B

```

      222                                223
Y  5'-CCAGGTG|ggcctc                                gcaggtg|TCCTGCC-3'

      1950                                1952
1  5'-AAAGAGG|GTGGCTG.....AACAGAA|GCCGAGC-3'

      2130                                2167
a  5'-TGTCAGG|gtggatg.....cccccag|GACAGGC-3'

      2286                                2468
b  5'-GAGCCAC|gtctcta.....ggggcaa|GTCCTAC-3'

      2843                                2844
2  5'-ACTCCAG|GTGAGCG.....XXXXXXX|CTATGCC-3'

      3157
3  5'-AACGCAG|CCGAAGAAAACATTTCTGTCGTGACTCCTGCGGTGCTTGGGTGCGGACAGCCAGAGATGG
    T A A E E N I L V V T P A V L G S G Q P E M E

      AGCCACCCCGCAGACCGTCGGGTGTGGGCAGCTTTCCGGTGTCTCCTGGGAGGGGAGTTG
      P P R R P S G V G S F P V S P G R G V G

                                3158
      GGCTGGGCCTGTGACTCCTCAGCCTCTGTTTTCCCCAG|GGATGTC-3'
      L G L *

```

Fig. 7C

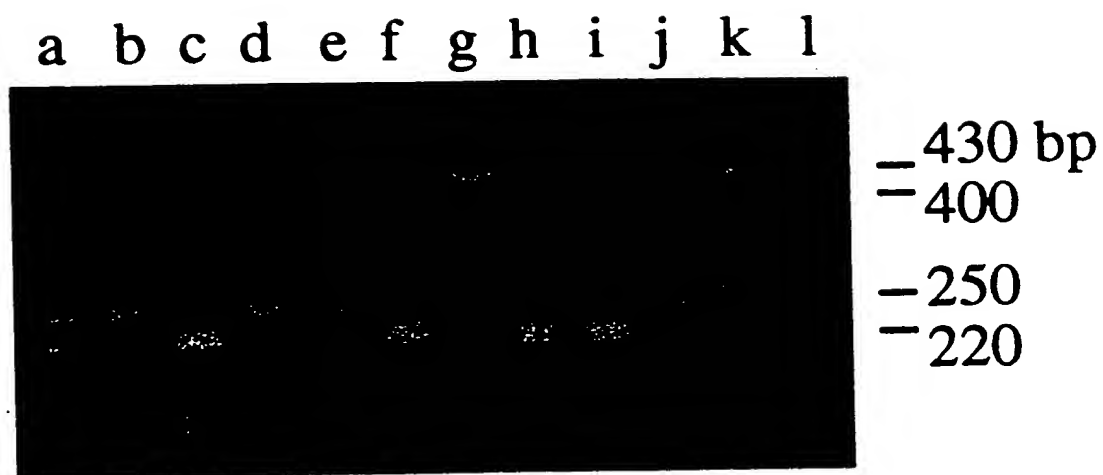


Fig. 8

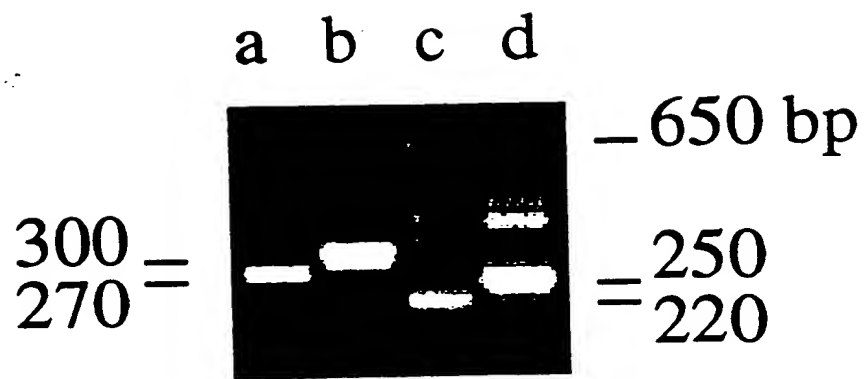
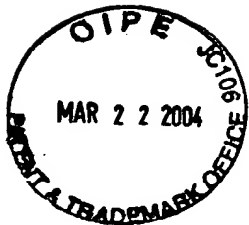


Fig. 9

Fig. 10A



sequence "3" 159 bases

CCGAAGAAAACATTTCTGTCGTGACTCCTGCGGTGCTTGGGTCGGGACAGCCAGAG
AlaGluGluAsnIleSerValValThrProAlaValLeuGlySerGlyGlnProGlu

ATGGAGCCACCCCGCAGACCGTCGGGTGTGGGCAGCTTTCGGGTGTCTCCTGGGAGG
MetGluProProArgArgProSerGlyValGlySerPheProValSerProGlyArg

GGAGTTGGGCTGGGCCTGTGACTCCTCAGCCTCTGTTTTCCCCCAG
GlyValGlyLeuGlyLeu *

sequence "X" unknown length

...GACAGTCACCAGGGGGTTGACCGCCGACTGGGCGTCCCCAGGGTTGACTATAGGA
CCAGGTGTCCAGGTGCCCTGCAAGTAGAGGGGCTCTCAGAGGCGTCTGGCTGGCATGG
GTGGACGTGGCCCCGGGCATGGCCTTCTGCGTGTGCTGCCGTGGGTGCCCTGAGCCCT
CACTGAGTCGGTGGGGGCTTGTGGCTTCCCGTGAGCTTCCCCCTAGTCTGTTGTCTGG
CTGAGCAAGCCTCCTGAGGGGCTCTCTATTG

partial sequence of genomic intron (approximately 2.7 kb)

GTGGCTGTGCTTTGGTTTAACTTCCTTTTAAACCAGAAGTGCGTTTGAGCCCCACATT
TGGTATCAGCTTAGATGAAGGGCCCGGAGGAGGGGCCACGGGACACAGCCAGGGCCAT
GGCACGGCGCCACCCATTTGTGCGCACAGTGAGGTGGCCGAGGTGCCGGTGCCTCCA
GAAAAGCAGCGTGGGGGTGTAGGGGAGCTCCTGGGGCAGGGAC....

Fig. 10B



Truncated telomerase

ATGCCGCGCGCTCCCGCTGCCGAGCGGTGCGCTCCCTGCTGCCGAGCCACTACCGGAGGTGCTGCCGCTGGCCACGTTCTGT
M P R A P R C R A V R S L L R S H Y R E V L P L A T F V

CGCGCGCTGGGGCCAGGGCTGGCGGCTGGTGACGCGGGGACCGGGCTTTCCGCGCGTGGTGCCCAAGTGCCTGGTGCGCTGGGACGACGGCGCCCCCGCGC
R R L G P Q G W R L V Q R G D P A A F R A L V A Q C L V C V P W D A R P P P A A

CCCCCTCTTCGCGAGGTGCTGCTGAAGGAGCTGGTGCCCGAGTGCTGCAGAGGCTGTGCGAGCGCGCGGAAGAACGTGCTGGCTTCGGCTTCGCGCTGCTGGACGGGGCCG
P S F R Q V S C L K E L V A R V L Q R L C E R G A K N V L A F G F A L L D G A R

CGGGGGCCCCCGAGGCTTACCACGAGCTGCCAGCTACCTGCCAACACGGTGACCGAGCACTGCGGGGAGCGGGGCGTGGGGGCTGCTGCTGCCCGCGTGGGCGACGACGT
G G P P E A F T T S V R S Y L P N T V T D A L R G S G A W G L L L R R V G D D V

GGTGGTTCACCTGCTGGCAGCTGCCGCTCTTTGCTGGTGCTGCCAGCTGCGCTACCGAGTGCTGGGCGCGCGCTGTACAGCTCGGCGCTGCCACTCAGGCCCGCCCCCGC
L V H L L A R C A L F V L V A P S C A Y Q V C G P P L Y Q L G A A T Q A R P P P

ACACGCTAGTGACCCCGAAGGCGCTGGGATGCGAACGGGCTGGAACCATAGCGTCAGGAGGCGGGGTCCCTGGGCTGCCAGCCCCGGGTGCGAGGAGGCGGGGGCAGTGC
H A S G P R R R L G C E R A W N H S V R E A G V P L G L P A P G A R R R G G S A

CAGCCGAAGTCTGCGTGGCCAGAGGCCAGGCGTGGCGCTGCCCTGAGCGGAGCGGACGCCGCTGGGCGAGGGTCTGGGCGCACCGGGCAGGACGCGTGGACCGAGTGACCG
S R S L P L P K R P R R G A A P E P E R T P V G Q G S W A H P G R T R G P S D R

TGGTTTCTGTGGTGTACCTGCCAGACCCGCCAAGAAGCCACCTCTTTGGAGGGTGGCGTCTCTGGCAGCGCCACTCCACCCATCCGTGGGCGCGCAGCACCGGGGGCCCC
G F C V V S P A R P A E E A T S L E G A L S G T R H S H P S V G R Q H H A G P P

ATCCACATCGCGGCCACGCTCCCTGGGACAGCGCTTGTCCCCGGTGTACGCCGAGACCAAGCACTTCTCTACTCTCAGGCGACAAGGAGCAGCTGCGGCCCTCTCTCTACTAG
S T S R P P R P W D T P C P P V Y A E T K H F L Y S S G D K E Q L R P S F L L S

CTCTCTGAGGCCAGCGCTGACTGGCGCTCGGAGGCTCGTGGAGACCATCTTTCTGGTTCCAGGCGCTGGATGCCAGGACTCCCGCAGGTGCCCCGCTGCCAGCGCTACTGGCA
S L R P S L T G A R R L V E T I F L G S R P W M P G T P R R L P R L P Q R Y W Q

AATCGGGCCCCGTTTCTGGAGCTGCTGGGAACACGCGAGTGCCCTACGGGGTGTCTCTCAAGACGCACTGCCGCTGCGAGCTGCGGTACCCACGACCGGTGTCTGTGCCG
M R P L F L E L L G N H A Q C P Y G V L L K T H C P L R A A V T P A A G V C A R

GGAGAAGCCCCAGGGCTGTGGCGGCCCCGAGGAGGAGACAGACCCCGTGGCTGGTGAGCTGCTCGCCAGCAGCAGCCCGTGGCAGGTGTACGGCTCTGTGGGGCGCTG
E K P Q G S V A A P E E E D T D P R R L V Q L L R Q H S S P W Q V Y G F V R A C

CCTGCGCGGCTGGTGCCCCAGGCTCTGGGGTCCAGGCACAACGACCGCTTCTCAGGAACACCAAGATTATCTCCCTGGGAAGCATGCCAAGCTCTCGCTGCAGGAGCT
L R R L V P P G L W G S R H N E R R F L R N T K K F I S L G K H A K L S L Q E L

GACGTGGAAGATGAGCGTGGGACTGCGCTTGGCTGCGCAGGAGCCAGGGGTGGCTGTGTCCGGCGCAGAGCACCCTGCGTGAGGAGATCTGGCCAAAGTCTGCACTGGCT
T W K M S V R D C A W L R R S P G V G C V P A A E H R L R E E I L A K F L H W L

GATGAGTGTGTACGTGCTGAGCTGCTCAGGTCTTTCTTTATGTACGGAGACCACGTTTCAAAGAACAGGCTCTTTTCTACCGGAAGAGTGTCTGGAGCAAGTTCAAAGCATTGG
M S V Y V V E L L R S F F Y V T E T T F Q K N R L F F Y R K S V W S K L Q S I G

AAT--NNN--GACAGTCACAGGGGGGTGACCGCGGACTGGGCGTCCCAGGGTTGACTATAGGACCAGGTGTCCAGGTGCCCTGCAAGTAGAGGGGCTCTCAGAGCGCTGTGGCTGG

Fig. 11A



CATGGGTGGACGTGCCCCGGGCATGGCCTTCTGCGTGCTGCCGTGGGTGCCCTGAGCCCTCACTGAGTCGGTGGGGCTTGTGGCTTCCCGTGAGCTTCCCCCTAGTCTGTTGTCTG

GCTGAGCAAGCCTCTGAGGGGCTCTATTG...

Fig. 11B

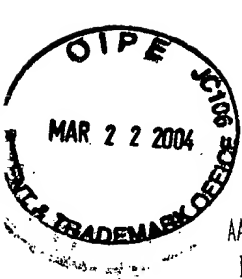


Truncated protein 1

ATGCCGCGCTCCCCGCTGCCGAGCGCTGCGCTCCCTGCTGCGCAGCCACTACCGGAGGTGCTGCCGTGGCCAGTTCTG
M P R A P R C R A V R S L L R S H Y R E V L P L A T F V

CGGCGCTGGGGCCAGGGCTGGCGGCTGGTGAGCGCGGGACCGCGGCTTTCCGCGCTGGTGCCAGTGCCTGGTGCGTGCCCTGGGACGACGGCCGCCCCCGCGC
R R L G P Q G W R L V Q R G D P A A F R A L V A Q C L V C V P W D A R P P P A A
CCCTCCTTCCGCGAGGTGCTGCTGAAGGAGTGGTGCGCGGAGTGCTGAGAGGCTGTGCGAGCGCGCGGAAGAAGTGTGGCTTCGGCTTCGCGCTGCTGGACGGGGCCG
P S F R Q V S C L K E L V A R V L Q R L C E R G A K N V L A F G F A L L D G A R
CGGGGGCCCCCGAGGCTTACCACGAGCTGCGCAGTACCTGCCAACAGGTGACGACGACTGCGGGGAGCGGGGCTGGGGCTGCTGCTGCGCGCTGGCGACGAGCT
G G P P E A F T T S V R S Y L P N T V T D A L R G S G A W G L L L R R V G D D V
GCTGTTACCTGCTGGCAGCTGCGCGCTTTTGCTGGTGCTCCAGCTGCGCTTACCAGTGTGCGGGCGCGCTGTACCAGCTCGGCGCTGCCACTAGGCCGCGCCCCCGC
L V H L L A R C A L F V L V A P S C A Y Q V C G P P L Y Q L G A A T Q A R P P P
ACAGCTAGTGGACCCGAAGGCTGTGGATGCGAACGGGCTGGAACATAGCGTCAAGGAGCGGGGTCCCTGGGCTGCCAGCCCCGGTGCGAGGAGCGCGGGGAGTGC
H A S G P R R R L G C E R A W N H S V R E A G V P L G L P A P G A R R R G G S A
CAGCCGAAGTCTGCCGTTGCCAAGAGCGCGGCTGCGCTGCGCTGAGCGGAGCGGACGCCGTTGGGCGAGGGTCTGGGCCACCCGGGAGGACGCGTGGACGAGTACCG
S R S L P L P K R P R R G A A P E P E R T P V G Q G S W A H P G R T R G P S D R
TGGTTTCTGTGGTGTCACCTGCCAGACCCCGAAGAAGCCACCTTTGGAGGGTGGCTCTCTGGCAGCGCCACTCCACCCATCGTGGGCGCCAGCACCGCGGGCCCCC
G F C V V S P A R P A E E A T S L E G A L S G T R H S H P S V G R Q H H A G P P
ATCCACATCGCGGCCACGCTCCCTGGGACAGCCTTGTCGCCGCTGACGCGAGACCAAGCACTTCTCTACTCTCAGGCGACAAGGAGAGCTGCGGGCTCTCTCTACTCAG
S T S R P P R P W D T P C P P V Y A E T K H F L Y S S G D K E Q L R P S F L L S
CTCTCTGAGGCGGAGCTGCTGCGCTGCGAGGCTGCTGGAGACCATTTCTGGGTTCCAGGCTTGGATGCCAGGAGTCCCGCAGGTTGCCCGCTGCGCCAGCTACTGGCA
S L R P S L T G A R R L V E T I F L G S R P W M P G T P R R L P R L P Q R Y W Q
AATGCGGCTGTTTCTGGAGTGTGGGAACACGCGCAGTGGCTTACGGGTGCTCCTCAAGAGCACTGCGGCTGCGAGCTGCGGTACCCAGCAGCGGTGCTGTGCGCG
M R P L F L E L L G N H A Q C P Y G V L L K T H C P L R A A V T P A A G V C A R
GGAGAAGCCCGAGGCTGTGTGGCGGCCCCGAGGAGGAGACAGACCCCGTGCCTGGTGAGCTGCTCGCCAGCAGCAGCCCTGGCAGGTGTACGGCTTGTGCGGGCTG
E K P Q G S V A A P E E E D T D P R R L V Q L L R Q H S S P W Q V Y G F V R A C
CCTGCGCGGCTGGTGGCCCGAGGCTTGGGCTCCAGGCACAACGAAGCGCTTCTCAGGAACCAAGAAGTTCATCTCCCTGGGAAGCATGCCAAGCTCTCGCTGAGGAGCT
L R R L V P P G L W G S R H N E R R F L R N T K K F I S L G K H A K L S L Q E L
GACGTGAAGATGAGCGTGGGAGTGGCTTGGTGGCAGGAGCCAGGGGTTGGCTGTGTTCCGGCGCAGAGCACCGTGTGCTGAGGAGATCTGGCCAAGTTCCTGCACTGGCT
T W K M S V R D C A W L R R S P G V G C V P A A E H R L R E E I L A K F L H W L
GATGAGTGTGTACGTGCTGAGCTGCTCAGGTCTTTCTTTATGTACGGAGACACGTTTCAAAGAAGAGGCTTTTTTCTACCGAAGAGTGTGGAGCAAGTGGCAAAGATTGG
M S V Y V V E L L R S F F Y V T E T T F Q K N R L F F Y R K S V W S K L Q S I G

Fig. 11C

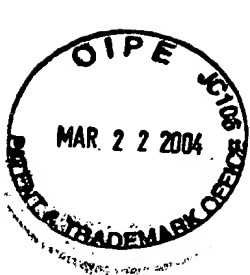


AATCAGACAGCACTTGAAGAGGGTGCAGCTGCGGGAGCTGTCCGAAGCAGAGGTCAGGCAGCATCGGGAAGCCAGGCCCGCCCTGCTGACGTCCAGACTCCGCTTCATCCCCAAGCCTGA
I R Q H L K R V Q L R E L S E A E V R Q H R E A R P A L L T S R L R F I P K P D

GTGGCTGTGCTTTGGTTAACTTCCTTTTAAACCAGAA
V A V L W F T F L F N Q K

CGGGCTGCGGCCGATTGTGAACATGGACTACGTCGTGGGAGCCAGAACGTTCCGCAGAGAAAAGGGCCGAGCGTCTCACCTCGAGGGTGAAGGCACCTGTTACGCGTGCTCAACTACGA
G L R P I V N M D Y V V G A R T F R R E K R P S V S F R G *

Fig. 11D



Truncated protein 2

ATGCCGCGCGCTCCCGCTGCCGAGCCGTGCGCTCCCTGCTGCCGAGCCACTACCGCGAGGTGCTGCCGCTGGCCACGTTTCGTG
M P R A P R C R A V R S L L R S H Y R E V L P L A T F V

CGGCGCTGGGGCCCCAGGGCTGGCGGCTGGTGACGCGGGGACCGGCGGCTTCCGCGCGCTGGTGGCCCAAGTGCCTGGTGTGCGTGCCCTGGGACGCACGGCCGCCCCCGCGC
R R L G P Q G W R L V Q R G D P A A F R A L V A Q C L V C V P W D A R P P P A A

CCCCCTCTCCGCCAGGTGCTGCTGAAGGAGCTGGTGGCCGAGTGTGACAGGCTGTGGAGCGCGCGCGAAGAAGCTGCTGGCTTCGGCTTCGGCTGCTGGACGGGGCCG
P S F R Q V S C L K E L V A R V L Q R L C E R G A K N V L A F G F A L L D G A R

CGGGGGCCCCCGAGGCTTACCACAGCGTGGCAGCTACCTGCCCAACACGGTGACGACGACTGCGGGGAGCGGGGCTGGGGGCTGCTGCTGCGCCGCTGGGCGACGACGT
G G P P E A F T T S V R S Y L P N T V T D A L R G S G A W G L L L R R V G D D V

GCTGGTTCACCTGCTGGCAGCTGCGCGCTCTTGTGCTGGTGGCTCCAGCTGCGGCTACCAAGTGTGCGGGCCGCGCTGTACCAGCTCGGCGCTGCCACTCAGGCCCGCCCCCGC
L V H L L A R C A L F V L V A P S C A Y Q V C G P P L Y Q L G A A T Q A R P P P

ACACGCTAGTGGACCCGAAGGCTGTGGATGCGAACGGGCTGGAACCATAGCGTCAGGGAGGCGGGGTCCCTGGGCTGCCAGCCCCGGGTGCGAGGAGGCGGGGGCAGTGC
H A S G P R R R L G C E R A W N H S V R E A G V P L G L P A P G A R R R G G S A

CAGCCGAAGTCTGCCGTTGCCAAGAGGCCAGGCGTGGCGCTGCCCTGAGCCGAGCGGACGCCGTTGGGAGGGGCTCTGGGCCACCCGGGAGGACGCTGGACCGAGTGACCG
S R S L P L P K R P R R G A A P E P E R T P V G Q G S W A H P G R T R G P S D R

TGGTTTCTGTGGTGTACCTGCCAGACCCCGAAGAAGCCACCTCTTTGGAGGGTGGCTCTCTGGCAGCGCCACTCCACCCATCGTGGGCGCCAGCACCACGGGGCCCCC
G F C V V S P A R P A E E A T S L E G A L S G T R H S H P S V G R Q H H A G P P

ATCCACATCGCGGCCACCACGCTCCCTGGGACACGCTTGTCCCCGGTGTACGCGGAGACCAAGCACTTCTCTACTCTCAGGCGACAAGGAGCAGCTGCGGCCCTCTCTCTACTCAG
S T S R P P R P W D T P C P P V Y A E T K H F L Y S S G D K E Q L R P S F L L S

CTCTCTGAGGCCAGCCTGACTGGCGCTCGGAGGCTCGTGGAGACCATCTTCTGGGTTCCAGGCCCTGGATGCCAGGACTCCCCGAGGTGCCCCGCTGCCCCAGCGCTACTGGCA
S L R P S L T G A R R L V E T I F L G S R P W M P G T P R R L P R L P Q R Y W Q

AATGCGGCCCTGTTTCTGGAGCTGCTTGGGAACACGCGCAGTGGCCCTACGGGGTGTCTCTCAAGACGCACTGCCCGCTGCGAGCTGCGGTACCCGAGCAGCGGTGTCTGTGCCG
M R P L F L E L L G N H A Q C P Y G V L L K T H C P L R A A V T P A A G V C A R

GGAGAAGCCCCAGGGCTGTGTGGCGGCCCCGAGGAGGAGACACAGCCCCGTCGCTGGTGCAGCTGCTCCGCCAGCACAGCAGCCCTGGCAGGTGTACGGCTTCGTGCGGGCTG
E K P Q G S V A A P E E E D T D P R R L V Q L L R Q H S S P W Q V Y G F V R A C

CCTGCGCGGGCTGGTGGCCCCAGGCTCTGGGGCTCCAGGCACAACGAACGCCGCTTCTCAGGAACACCAAGAAGTTCATCTCCCTGGGGAAGCATCCAAGCTCTCGCTGCAGGAGCT
L R R L V P P G L W G S R H N E R R F L R N T K K F I S L G K H A K L S L Q E L

GACGTGAAGATGAGCTGCGGAGCTGCGCTTGGCTGCGCAGGAGCCAGGGGTGGCTGTGTTCCGGCCGAGAGCAGCTGCTGCGTGAGGAGATCTGGCCAAGTTCCTGCACTGGCT
T W K M S V R D C A W L R R S P G V G C V P A A E H R L R E E I L A K F L H W L

GATGAGTGTGACGTGCTGAGCTGCTCAGGTCTTTCTTTATGTACGGAGACACGTTTCAAAGAAGAGGCTCTTTTCTACCGGAAGAGTGTCTGGAGCAAGTGTCAAAGCATTGG
M S V Y V V E L L R S F F Y V T E T T F Q K N R L F F Y R K S V W S K L Q S I G

Fig. 11E

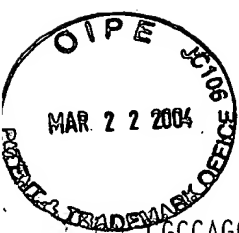
CCAGGGGATCCCGAGGGCTCCATCCTCTCCACGCTGCTCTGCAGCCTGTGCTACGGCGACATGGAGAACAAGCTGTTTGCGGGGATTGGCGGGACGGGCTGCTCCTCGCTTTGGTGA
P G D P A G L H P L H A A L Q P V L R R H G E Q A V C G D S A G R A A P A F G G
TGATTTCTGTGGTGACACCTCACCTCACCCACGCGAAAACCTTCCTCAGGACCTGGTCCGAGGTGTCCTCGAGTATGGCTGCGTGGTGAACCTGCGGAAGACAGTGGTGAACCTCC



Reference protein

ATGCCGCGCTCCCCGCTGCCGAGCCGTGCGCTCCCTGCTGCGCAGCCACTACCGCGAG	60
MetProArgAlaProArgCysArgAlaValArgSerLeuLeuArgSerHisTyrArgGlu	20
GTGCTGCCGCTGGCCACGTTCTGTGCGGCGCCTGGGGCCCCAGGGCTGGCGGCTGGTGCA	120
ValLeuProLeuAlaThrPheValArgArgLeuGlyProGlnGlyTrpArgLeuValGln	40
CGCGGGGACCCGGCGGCTTTCCGCGCGCTGGTGGCCAGTGCCTGGTGTGCGTGCCCTGG	180
ArgGlyAspProAlaAlaPheArgAlaLeuValAlaGlnCysLeuValCysValProTrp	60
GACGCACGGCCGCCCCCGCCGCCCCCTCCTTCCGCCAGGTGTCCTGCCTGAAGGAGCTG	240
AspAlaArgProProProAlaAlaProSerPheArgGlnValSerCysLeuLysGluLeu	80
GTGGCCCGAGTGCTGCAGAGGCTGTGCGAGCGCGGCGCGAAGAACGTGCTGGCCTTCGGC	300
ValAlaArgValLeuGlnArgLeuCysGluArgGlyAlaLysAsnValLeuAlaPheGly	100
TTGCGCTGCTGGACGGGGCCCGGGGGCCCCCCCCGAGGCCTTACCACCAGCGTGCGC	360
PheAlaLeuLeuAspGlyAlaArgGlyGlyProProGluAlaPheThrThrSerValArg	120
AGCTACCTGCCAACACGGTGACCGACGCACTGCGGGGGAGCGGGGCGTGGGGGCTGCTG	420
SerTyrLeuProAsnThrValThrAspAlaLeuArgGlySerGlyAlaTrpGlyLeuLeu	140
TTGCGCCGCGTGGGCGACGACGTGCTGGTTCACCTGCTGGCACGCTGCGCGCTCTTTGTG	480
LeuArgArgValGlyAspAspValLeuValHisLeuLeuAlaArgCysAlaLeuPheVal	160
CTGGTGGCTCCCAGCTGCGCTACCAGGTGTGCGGGCCGCGCTGTACCAGCTCGGCGCT	540
LeuValAlaProSerCysAlaTyrGlnValCysGlyProProLeuTyrGlnLeuGlyAla	180
GCCACTCAGGCCCCGGCCCCCGCCACACGCTAGTGGACCCCGAAGGCGTCTGGGATGCGAA	600
AlaThrGlnAlaArgProProProHisAlaSerGlyProArgArgArgLeuGlyCysGlu	200
CGGGCCTGGAACCATAGCGTCAGGGAGGCCGGGGTCCCCCTGGGCCTGCCAGCCCCGGGT	660
ArgAlaTrpAsnHisSerValArgGluAlaGlyValProLeuGlyLeuProAlaProGly	220
GCGAGGAGGCGCGGGGGCAGTGCCAGCCGAAGTCTGCCGTTGCCAAGAGGCCAGGCGT	720
AlaArgArgArgGlyGlySerAlaSerArgSerLeuProLeuProLysArgProArgArg	240
GGCGCTGCCCTGAGCCGGAGCGGACGCCCGTTGGGCAGGGGTCTGGGCCCACCCGGGC	780
GlyAlaAlaProGluProGluArgThrProValGlyGlnGlySerTrpAlaHisProGly	260
AGGACGCGTGGACCGAGTGACCGTGGTTTCTGTGTGGTGTACCTGCCAGACCCGCCGAA	840
ArgThrArgGlyProSerAspArgGlyPheCysValValSerProAlaArgProAlaGlu	280
GAAGCCACCTCTTTGGAGGGTGCGCTCTCTGGCACGCGCCACTCCCACCCATCCGTGGGC	900
GluAlaThrSerLeuGluGlyAlaLeuSerGlyThrArgHisSerHisProSerValGly	300

Fig. 11G



CGCCAGCACCACGCGGGCCCCCATCCACATCGCGGCCACCACGTCCCTGGGACACGCCT	960
ArgGlnHisHisAlaGlyProProSerThrSerArgProProArgProTrpAspThrPro	320
TGTCCCCGGTGTACGCCGAGACCAAGCACTTCTCTACTCCTCAGGCGACAAGGAGCAG	1020
CysProProValTyrAlaGluThrLysHisPheLeuTyrSerSerGlyAspLysGluGln	340
CTGCGGCCCTCCTTCTACTCAGCTCTCTGAGGCCAGCCTGACTGGCGCTCGGAGGCTC	1080
LeuArgProSerPheLeuLeuSerSerLeuArgProSerLeuThrGlyAlaArgArgLeu	360
GTGGAGACCATCTTTCTGGGTTCAGGCCCTGGATGCCAGGGACTCCCCGAGGTTGCCC	1140
ValGluThrIlePheLeuGlySerArgProTrpMetProGlyThrProArgArgLeuPro	380
CGCCTGCCCCAGCGCTACTGGCAAATGCGGCCCTGTTTCTGGAGCTGCTTGGGAACCAC	1200
ArgLeuProGlnArgTyrTrpGlnMetArgProLeuPheLeuGluLeuLeuGlyAsnHis	400
GCGCAGTGCCCCTACGGGGTGCTCCTCAAGACGCACTGCCCCGCTGCGAGCTGCGGTCACC	1260
AlaGlnCysProTyrGlyValLeuLeuLysThrHisCysProLeuArgAlaAlaValThr	420
CCAGCAGCCGGTGTCTGTGCCCCGGGAGAAGCCCCAGGGCTCTGTGGCGGCCCCGAGGAG	1320
ProAlaAlaGlyValCysAlaArgGluLysProGlnGlySerValAlaAlaProGluGlu	440
GAGGACACAGACCCCCGTCGCCTGGTGCAGCTGCTCCGCCAGCACAGCAGCCCCTGGCAG	1380
GluAspThrAspProArgArgLeuValGlnLeuLeuArgGlnHisSerSerProTrpGln	460
GTGTACGGCTTCGTGCGGGCTGCCTGCGCCGGCTGGTGGCCCCAGGCCTCTGGGGCTCC	1440
ValTyrGlyPheValArgAlaCysLeuArgArgLeuValProProGlyLeuTrpGlySer	480
AGGCACAACGAACGCCGCTTCCTCAGGAACACCAAGAAGTTCATCTCCCTGGGGAAGCAT	1500
ArgHisAsnGluArgArgPheLeuArgAsnThrLysLysPheIleSerLeuGlyLysHis	500
GCCAAGCTCTCGCTGCAGGAGCTGACGTGGAAGATGAGCGTGCGGGGCTGCGCTTGGCTG	1560
AlaLysLeuSerLeuGlnGluLeuThrTrpLysMetSerValArgAspCysAlaTrpLeu	520
CGCAGGAGCCCAGGGGTTGGCTGTGTTCCGGCCGAGAGCACCGTCTGCGTGAGGAGATC	1620
ArgArgSerProGlyValGlyCysValProAlaAlaGluHisArgLeuArgGluGluIle	540
CTGGCCAAGTTCCTGCACTGGCTGATGAGTGTGTACGTCGTCGAGCTGCTCAGGTCTTTC	1680
LeuAlaLysPheLeuHisTrpLeuMetSerValTyrValValGluLeuLeuArgSerPhe	560
TTTTATGTCACGGAGACCACGTTTCAAAGAAGCAGGCTCTTTTTCTACCGGAAGAGTGTC	1740
PheTyrValThrGluThrThrPheGlnLysAsnArgLeuPhePheTyrArgLysSerVal	580
TGGAGCAAGTTGCAAAGCATTGGAATCAGACAGCACTGAAGAGGGTGACGTGCGGGAG	1800
TrpSerLysLeuGlnSerIleGlyIleArgGlnHisLeuLysArgValGlnLeuArgGlu	600
CTGTCGGAAGCAGAGGTCAGGCAGCATCGGGAAGCCAGGCCCGCCCTGCTGACGTCCAGA	1860
LeuSerGluAlaGluValArgGlnHisArgGluAlaArgProAlaLeuLeuThrSerArg	620

Fig. 11H



CTCCGCTTCATCCCCAAGCCTGACGGGCTGCGGCCGATTGTGAACATGGACTACGTCGTG	1920
LeuArgPheIleProLysProAspGlyLeuArgProIleValAsnMetAspTyrValVal	640
 GGAGCCAGAACGTTCCGCAGAGAAAAGAGGGCCGAGCGTCTCACCTCGAGGGTGAAGGCA	1980
GlyAlaArgThrPheArgArgGluLysArgAlaGluArgLeuThrSerArgValLysAla	660
 CTGTTCAAGCTGCTCAACTACGAGCGGGCGCGGCCCGCCTCCTGGGCGCCTCTGTG	2040
LeuPheSerValLeuAsnTyrGluArgAlaArgArgProGlyLeuLeuGlyAlaSerVal	680
 CTGGGCCTGGACGATATCCACAGGGCCTGGCGCACCTTCGTGCTGCGTGTGCGGGCCCAG	2100
LeuGlyLeuAspAspIleHisArgAlaTrpArgThrPheValLeuArgValArgAlaGln	700
 GACCCGCCGCTGAGCTGTACTTTGTCAAGGTGGATGTGACGGGCGCGTACGACACCATC	2160
AspProProProGluLeuTyrPheValLysValAspValThrGlyAlaTyrAspThrIle	720
 CCCCAGGACAGGCTCACGGAGGTCATCGCCAGCATCATCAAACCCAGAACACGTACTGC	2220
ProGlnAspArgLeuThrGluValIleAlaSerIleIleLysProGlnAsnThrTyrCys	740
 GTGCGTCGGTATGCCGTGGTCCAGAAGGCCGCCATGGGCACGTCCGCAAGGCCTTCAAG	2280
ValArgArgTyrAlaValValGlnLysAlaAlaHisGlyHisValArgLysAlaPheLys	760
 AGCCACGTCTCTACCTTGACAGACCTCCAGCCGTACATGCGACAGTTCGTGGCTCACCTG	2340
SerHisValSerThrLeuThrAspLeuGlnProTyrMetArgGlnPheValAlaHisLeu	780
 CAGGAGACCAGCCCGCTGAGGGATGCCGTCGTCATCGAGCAGAGCTCCTCCCTGAATGAG	2400
GlnGluThrSerProLeuArgAspAlaValValIleGluGlnSerSerSerLeuAsnGlu	800
 GCCAGCAGTGGCCTCTTCGACGTCTTCCTACGCTTCATGTGCCACCACGCCGTGCGCATC	2460
AlaSerSerGlyLeuPheAspValPheLeuArgPheMetCysHisHisAlaValArgIle	820
 AGGGGCAAGTCCTACGTCCAGTGCCAGGGGATCCCGCAGGGCTCCATCCTCTCCACGCTG	2520
ArgGlyLysSerTyrValGlnCysGlnGlyIleProGlnGlySerIleLeuSerThrLeu	840
 CTCTGCAGCCTGTGCTACGGCGACATGGAGAACAAGCTGTTTGCGGGGATTGGCGGGAC	2580
LeuCysSerLeuCysTyrGlyAspMetGluAsnLysLeuPheAlaGlyIleArgArgAsp	860
 GGGCTGCTCCTGCGTTTGGTGGATGATTTCTTGTTGGTGACACCTCACCTCACCCACGCG	2640
GlyLeuLeuLeuArgLeuValAspAspPheLeuLeuValThrProHisLeuThrHisAla	880
 AAAACCTTCCTCAGGACCCTGGTCCGAGGTGTCCCTGAGTATGGCTGCGTGGTGAACCTTG	2700
LysThrPheLeuArgThrLeuValArgGlyValProGluTyrGlyCysValValAsnLeu	900
 CGGAAGACAGTGGTGAACCTTCCTGTAGAAGACGAGGCCCTGGGTGGCACGGCTTTTGTT	2760
ArgLysThrValValAsnPheProValGluAspGluAlaLeuGlyGlyThrAlaPheVal	920
 CAGATGCCGGCCACGGCCTATTCCCTGGTGCGGCCTGCTGCTGGATACCCGGACCCTG	2820
GlnMetProAlaHisGlyLeuPheProTrpCysGlyLeuLeuLeuAspThrArgThrLeu	940

Fig. 11I



GAGGTGCAGAGCGACTACTCCAGCTATGCCCCGACCTCCATCAGAGCCAGTCTCACCTTC	2880
GluValGlnSerAspTyrSerSerTyrAlaArgThrSerIleArgAlaSerLeuThrPhe	960
AACCGCGGCTTCAAGGCTGGGAGGAACATGCGTCGAACTCTTTGGGGTCTTGCGGCTG	2940
AsnArgGlyPheLysAlaGlyArgAsnMetArgArgLysLeuPheGlyValLeuArgLeu	980
AAGTGTCACAGCCTGTTTCTGGATTTGCAGGTGAACAGCCTCCAGACGGTGTGCACCAAC	3000
LysCysHisSerLeuPheLeuAspLeuGlnValAsnSerLeuGlnThrValCysThrAsn	1000
ATCTACAAGATCCTCCTGCTGCAGGCGTACAGTTTTACGCATGTGTGCTGCAGCTCCCA	3060
IleTyrLysIleLeuLeuLeuGlnAlaTyrArgPheHisAlaCysValLeuGlnLeuPro	1020
TTTCATCAGCAAGTTTGAAGAACCCACATTTTTCTGCGCGTCATCTCTGACACGGCC	3120
PheHisGlnGlnValTrpLysAsnProThrPhePheLeuArgValIleSerAspThrAla	1040
TCCCTCTGCTACTCCATCCTGAAAGCCAAGAACGCAGGGATGTCGCTGGGGGCCAAGGGC	3180
SerLeuCysTyrSerIleLeuLysAlaLysAsnAlaGlyMetSerLeuGlyAlaLysGly	1060
GCCGCCGGCCCTCTGCCCTCCGAGGCCGTGCAGTGGCTGTGCCACCAAGCATTCTGCTC	3240
AlaAlaGlyProLeuProSerGluAlaValGlnTrpLeuCysHisGlnAlaPheLeuLeu	1080
AAGCTGACTCGACACCGTGTACCTACGTGCCACTCCTGGGGTCACTCAGGACAGCCCAG	3300
LysLeuThrArgHisArgValThrTyrValProLeuLeuGlySerLeuArgThrAlaGln	1100
ACGCAGCTGAGTCGGAAGCTCCCGGGGACGACGCTGACTGCCCTGGAGGCCGAGCCAAC	3360
ThrGlnLeuSerArgLysLeuProGlyThrThrLeuThrAlaLeuGluAlaAlaAlaAsn	1120
CCGGCACTGCCCTCAGACTTCAAGACCATCCTGGAC	3420
ProAlaLeuProSerAspPheLysThrIleLeuAsp	1132

Fig. 11J



JAN 2 2004

Truncated protein 3

ATGCCGCGGCTCCCGCTGCCGAGCGTGGCGTCCCTGCTGCGCAGCCACTACCGGAGGTGCTGCCGTGCCACGTTCTGTG
M P R A P R C R A V R S L L R S H Y R E V L P L A T F V

CGGCGCTGGGGCCAGGGCTGGCGGCTGGTGACGCGGGGACCGGGCGGCTTTCGCGCGCTGGTGGCCAGTGCCCTGGTGTGCGTGGCTGGGACGACGGCCGCCCCGCGCG
R R L G P Q G W R L V Q R G D P A A F R A L V A Q C L V C V P W D A R P P P A A

CCCCTCCTCCGCCAGGTGCTGCTGAAGGAGCTGGTGGCCGAGTGCTGCAGAGGCTGTGCGAGCGGGCGCAAGAACGTGCTGGCCTTCGGCTTCGCGCTGTGGACGGGGCCG
P S F R Q V S C L K E L V A R V L Q R L C E R G A K N V L A F G F A L L D G A R

CGGGGGCCCCCGAGGCTTACCACAGCGTGGCAGCTACCTGCCAACACGGTGACGACGCACTGCGGGGAGCGGGGCTGGGGGTGCTGCTGCGCGCTGGGCGACGACGT
G G P P E A F T T S V R S Y L P N T V T D A L R G S G A W G L L L R R V G D D V

GCTGGTTCACCTGCTGGCAGCTGCGCGCTTTTGTGCTGGTGGCTCCAGCTGCGCTACAGGTGTGCGGGCGCCGCTGTACCAGCTCGGCGTGGCACTAGGCCCCGGCCCCGCG
L V H L L A R C A L F V L V A P S C A Y Q V C G P P L Y Q L G A A T Q A R P P P

ACAGCTAGTGAGCCCCGAAGGCTCTGGGATGCGAACGGGCTGGAACCATAGCTCAGGGAGGCGGGGTCCCCCTGGGCTGCCAGCCCCGGGTGCGAGGAGCGCGGGGCGAGTGC
H A S G P R R R L G C E R A W N H S V R E A G V P L G L P A P G A R R R G G S A

CAGCCGAAGTCTGCCGTTGCCAAGAGGCCAGGCGTGGCGCTGCCCTGAGCGGAGCGGACGCCGTTGGGAGGGTCTGGGCCACCCGGGCGAGGACGCTGGACGAGTGACCG
S R S L P L P K R P R R G A A P E P E R T P V G Q G S W A H P G R T R G P S D R

TGGTTTCTGTGTGTGTACCTGCCAGACCCGCGAAGAAGCCACCTCTTTGGAGGGTGGCGTCTCTGCGACGCGCACTCCACCCATCCGTGGGCGCCAGCACCAGCGGGGCCCCC
G F C V V S P A R P A E E A T S L E G A L S G T R H S H P S V G R Q H H A G P P

ATCCACATCGCGGCCACCGCTCCCTGGGACAGCCTTGTCCCCGGGTACGCCGAGACCAAGCACTTCCTCTACTCTCAGGCGACAAGGAGCAGCTGGCGCCCTCTCTACTACTAG
S T S R P P R P W D T P C P P V Y A E T K H F L Y S S G D K E Q L R P S F L L S

CTCTCTGAGGCCAGCCTGACTGGCGCTCGGAGGCTCGTGAGACCATTTTCTGGGTTCCAGGCCCTGGATGCCAGGCACTCCCGCAGGTTGCCCGGCTGCCCCAGCGCTACTGGCA
S L R P S L T G A R R L V E T I F L G S R P W M P G T P R R L P R L P Q R Y W Q

AATCGGCCCCGTGTTCTGGAGCTGCTTGGGAACACGCGCAGTGCCCCACGGGGTGTCTCAAGACGCACTGCCCGTGGAGCTGCGGTACCCCGAGCAGCGGTGTCTGTGCCCG
M R P L F L E L L G N H A Q C P Y G V L L K T H C P L R A A V T P A A G V C A R

GGAGAAGCCCCAGGGCTCTGTGGCGGCCCCGAGGAGGAGACAGACCCCGTGGCTGGTGACGCTGCTCCGCGACACAGCAGCCCTGGCAGGTGTACGGCTCTGTGCGGGCTG
E K P Q G S V A A P E E E D T D P R R L V Q L L R Q H S S P W Q V Y G F V R A C

CTGCGCGGCTGGTGCCCCAGGCTCTGGGGCTCCAGGCACAACGAACGCCGCTTCTCAGGAACCAAGAAGTTTCATCTCCCTGGGAAGCATGCCAAGCTCTCGTGCAGGAGCT
L R R L V P P G L W G S R H N E R R F L R N T K K F I S L G K H A K L S L Q E L

GACGTGAAGATGAGCGTGGGACTGCGCTGGCTGCGCAGGAGCCAGGGGTGGCTGTGTTCCGGCGCAGAGCACCGTCTGCGTGAGGAGATCTGGCCAAGTTCTGCACTGGCT
T W K M S V R D C A W L R R S P G V G C V P A A E H R L R E E I L A K F L H W L

GATGAGTGTGTACGTCGAGCTGCTCAGGTCTTTCTTTATGTACGGAGACCAGGTTTCAAAGAACAGGCTCTTTTCTACCGGAAGAGTGTCTGGAGCAAGTTGCAAGATTGG
M S V Y V V E L L R S F F Y V T E T T F Q K N R L F F Y R K S V W S K L Q S I G

Fig. 11K



AATCAGACAGCACTTGAAGAGGGTGCAGCTGCGGGAGCTGTGGAAGCAGAGGTGAGGCAGATCGGGAAGCCAGGCCCGCCCTGCTGACGTCCAGACTCCGCTTCATCCCAAGCCTGA
I R Q H L K R V Q L R E L S E A E V R Q H R E A R P A L L T S R L R F I P K P D

CGGGCTGCGGCCGATTGTGAACATGGACTACGTGCTGGGAGCCAGAAGCTTCGCGAGAGAAAAGGGCCGAGCGTCTCACCTCGAGGGTGAAGGCACTGTTACGCGTGTCAACTACGA
G L R P I V N M D Y V V G A R T F R R E K R A E R L T S R V K A L F S V L N Y E

GCGGGCGCGGCCCGCCGCTCTGCTGGGCGCTGTGCTGGGCGCTGGACGATATCCACAGGGCCTGGCGCACCTTCGTGCTGCGTGTGCGGGCCAGGACCCGCGCCTGAGCTGTACTT
R A R R P G L L G A S V L G L D D I H R A W R T F V L R V R A Q D P P P E L Y F

TGTCAAGGTGGATGTGACGGGCGGTACGACACCATCCCCAGGACAGGCTCACGAGGTGATCGCCAGCATCATCAAACCCAGAACAGTACTGCGTGCCTGCGTATGCCGTGGTCCA
V K V D V T G A Y D T I P Q D R L T E V I A S I I K P Q N T Y C V R R Y A V V Q

GAAGGCCGCCATGGGCAGTCCGCAAGGCTTCAAGAGCCAGCTCTCTACCTTGACAGACCTCCAGCCGTACATGCGACAGTTGCTGGCTCACCTGACGAGACCCAGCCGCTGAGGGA
K A A H G H V R K A F K S H V S T L T D L Q P Y M R Q F V A H L Q E T S P L R D

TGCCGTGCTATCGAGCAGAGCTCCTCCCTGAATGAGGCCAGCAGTGGCCTCTTCGACGTCTTCTACGCTTCATGTGCCACCACGCCGTGCGCATCAGGGGCAAGTCTACGTCCAGTG
A V V I E Q S S S L N E A S S G L F D V F L R F M C H H A V R I R G K S Y V Q C

CCAGGGGATCCCGAGGGCTCCATCCTCTCCAGCTGCTCTGACGCTGTGCTACGGCGACATGGAGAACAGCTGTTGCGGGGATTGCGGGGACGGGCTGCTCTGCGTTTGGTGGA
Q G I P Q G S I L S T L L C S L C Y G D M E N K L F A G I R R D G L L L R L V D

TGATTTCTTGTGGTGACACCTCACCTCACCCACGCAAAACCTTCCTCAGGACCTGGTCCGAGGTGCTCCCTGAGTATGGCTGCGTGGTGAACCTTGCGGAAGACAGTGGTGAACCTCCC
D F L L V T P H L T H A K T F L R T L V R G V P E Y G C V V N L R K T V V N F P

TGTAGAAGACGAGGCCCTGGGTGGCAGGCTTTTGTTCAGATGCCGGCCACGGCCTATTCCCTGGTGGGCTGCTGCTGGATACCCGGACCTGGAGGTGCAGAGCGACTACTCCAG
V E D E A L G G T A F V Q M P A H G L F P W C G L L L D T R T L E V Q S D Y S R

GTGAGCGCACCTGGCCGGAAGTGAGCCTGTGCCCCGCTGGGGCAGGTGCTGCTGCAGGGCGTTGCGTCCACCTCTGCTTCCGTGTGGGGCAGGCGACTGCCAATCCCAAGGGTCAGA
*

TGCCACAGGGTGCCCTCGTCCATCTGGGGCTGAGCACAAATGCATCTTTCTGTGGAGTGAGGGTGCCTCACAACGGGAGCAGTTTTCTGTGCTATTTTGGTAA.....

Fig. 11L



Altered C-terminus protein

ATGCCGCGCGCTCCCCGCTGCCGAGCGTGCCTCCCTGCTGCCGAGCCACTACCGCAGGGTGCCTGCCGCTGGCCACGTTCTGT
M P R A P R C R A V R S L L R S H Y R E V L P L A T F V

CGGGCGCTGGGGCCCCAGGGCTGGCGGCTGGTGACGCGCGGGACCCGGCGGCTTCCGCGCGCTGGTGGCCAGTGCCTGGTGTGCGTGCCCTGGGACGCACGGCCGCCCCCGCCGC
R R L G P Q G W R L V Q R G D P A A F R A L V A Q C L V C V P W D A R P P P A A

CCCCCTCTCCGCCAGGTGCTGCTGAAGGAGCTGGTGGCCGAGTGTGCAGAGGCTGTGCGAGCGCGCGCGAAGAACGTGCTGGCTTCGGCTTCGCGCTGCTGGACGGGGCCCC
P S F R Q V S C L K E L V A R V L Q R L C E R G A K N V L A F G F A L L D G A R

CGGGGGCCCCCGAGGCTTACCACCAGCGTGCAGCTACCTGCCAACACGGTGACGACGACTCGGGGGAGCGGGGCTGGGGGCTGCTGCTGCGCGCGTGGGCGACGACGT
G G P P E A F T T S V R S Y L P N T V T D A L R G S G A W G L L L R R V G D D V

GCTGGTTCACCTGCTGGCAGCTGCGCGCTCTTTGCTGGTGGCTCCCACTGCGGCTACCAGGTGTGCGGGCGCGCTGTACCAGCTCGGCGTGCCTACTCAGGCCGGGGCCCCGCC
L V H L L A R C A L F V L V A P S C A Y Q V C G P P L Y Q L G A A T Q A R P P P

ACACGCTAGTGGACCCCAAGGCGTCTGGGATGCGAACGGGCTGGAACCATAGCGTCAAGGAGCGCGGGTCCCTGGGCTGCCAGCCCCGGGTGCGAGGAGGCGGGGGCAGTGC
H A S G P R R R L G C E R A W N H S V R E A G V P L G L P A P G A R R R G G S A

CAGCCGAAGTCTGCCGTTGCCAAGAGGCCAGGCGTGGCGCTGCCCTGAGCGGAGCGGACGCCGTTGGGCGAGGGTCTGGGCCACCCGGGCGAGGACGCGTGGACCGAGTGACCG
S R S L P L P K R P R R G A A P E P E R T P V G Q G S W A H P G R T R G P S D R

TGGTTTCTGTGGTGTACCTGCCAGACCCGCCAAGAAGCCACCTCTTTGGAGGGTGCCTCTCTGGCAGCGCCACTCCCACTCCGTTGGGCCCGCAGCACCACGGGGCCCCC
G F C V V S P A R P A E E A T S L E G A L S G T R H S H P S V G R Q H H A G P P

ATCCACATCGCGGCCACCACGTCCTGGGACACGCTTGTCCCCGGTGTACGCGGAGACCAAGCACTTCTCTACTCTCAGGCGACAAGGAGCAGCTGCGGCGCTCTCTCTACTCAG
S T S R P P R P W D T P C P P V Y A E T K H F L Y S S G D K E Q L R P S F L L S

CTCTCTGAGGCCAGCCTGACTGGCGCTCGGAGGCTCGTGGAGACCATCTTTCTGGGTTCCAGGCGCTGGATGCCAGGACTCCCCGAGGTTGCCCGGCTGCCCGAGCGTACTGGCA
S L R P S L T G A R R L V E T I F L G S R P W M P G T P R R L P R L P Q R Y W Q

AATGCGGCCCTGTTTCTGGAGCTGCTTGGGAACACGCGCAGTGGCCCTACGGGGTGTCTCTCAAGACGCACTGCCGCTGCGAGCTCGGGTACCCAGCAGCGGTGTCTGTGCCCC
M R P L F L E L L G N H A Q C P Y G V L L K T H C P L R A A V T P A A G V C A R

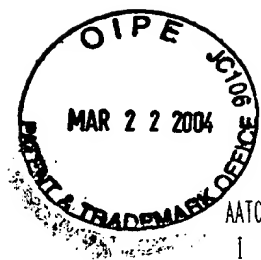
GGAGAAGCCCCAGGGCTCTGTGGCGGGCCCCGAGGAGGAGACACAGACCCCGTGCCTGGTGCAGCTGCTCCGCCAGCACAGCAGCCCTGGCAGGTGTACGGCTTCGTGCGGGCTG
E K P Q G S V A A P E E E D T D P R R L V Q L L R Q H S S P W Q V Y G F V R A C

CCTGCGCGGCTGGTGGCCCCAGGCTCTGGGGCTCCAGGCACAACGACGCCGCTTCTCAGGAACCAAGAAGTTTCATCTCCCTGGGGAAGCATGCCAAGCTCTCGTGCAGGAGCT
L R R L V P P G L W G S R H N E R R F L R N T K K F I S L G K H A K L S L Q E L

GACGTGAAGATAGCGTGCAGGACTGCGCTTGGCTGCGCAGGAGCCAGGGGTGGCTGTGTTCCGGCGCAGAGCAGCGTGTGCTGAGGAGATCCTGGCCAAGTTCTGCACTGGCT
T W K M S V R D C A W L R R S P G V G C V P A A E H R L R E E I L A K F L H W L

GATGAGTGTGACGTGCTGAGCTGCTCAGGTCTTTCTTTATGTACGGAGACCACTTTCAAAGAAGCGCTTTTTCTACCGGAAGAGTGTCTGGAGCAAGTTGCAAGCATTGG
M S V Y V V E L L R S F F Y V T E T T F Q K N R L F F Y R K S V W S K L Q S I G

Fig. 11M



AATCAGACGCACTTGAAGAGGTGCAGCTGCGGGAGCTGTGGAAGCAGAGGTGAGGCAGCATCGGAAGCCAGGCCCGCCCTGCTGACGTCCAGACTCCGCTTCATCCCAAGCCTGA
I R Q H L K R V Q L R E L S E A E V R Q H R E A R P A L L T S R L R F I P K P D

CGGGCTGCGGCCGATTGTGAACATGGAAGTACGTGCTGGGAGCCAGAAGCTTCGCGAGAGAAAGAGGGCCGAGCGTCTACCTCGAGGGTGAAGGCACTGTTACGCGTCTCAACTACGA
G L R P I V N M D Y V V G A R T F R R E K R A E R L T S R V K A L F S V L N Y E

GCGGGCGCGGCCCGCCGCTCTGCTGGGCGCTGTGCTGGGCTGGACGATATCCAGGGCTGGCGCACCCTTCGTGCTGCGTGTGCGGGCCAGGACCCGCGCTGAGCTGTACTT
R A R R P G L L G A S V L G L D D I H R A W R T F V L R V R A Q D P P P E L Y F

TGTCAGGTGGATGTGACGGGCGGTACGACACCATCCCCAGGACAGGCTCAGGAGGTCTCGCCAGCATCATCAAACCCAGAACAGTACTGCGTGGTGGTATGCCGTGGTCCA
V K V D V T G A Y D T I P Q D R L T E V I A S I I K P Q N T Y C V R R Y A V V Q

GAAGCGCGCATGGGACGTCGCGAAGGCTTCAAGAGCCAGTCTCTACCTTGACAGACCTCCAGCGGTACATGCGACAGTTCGTGGTCCACCTGCAGGAGACGAGCCGCTGAGGGA
K A A H G H V R K A F K S H V S T L T D L Q P Y M R Q F V A H L Q E T S P L R D

TGCCGTGCTATCGAGCAGAGCTCCTCCCTGAATGAGGCCAGCAGTGGCCTCTTCGACGCTTCTACGCTTCATGTGCCACCACGCCGTGCGCATCAGGGGCAAGTCTACGTCCAGTG
A V V I E Q S S S L N E A S S G L F D V F L R F M C H H A V R I R G K S Y V Q C

CCAGGGGATCCCGAGGGCTCCATCCTCTCCACGCTGCTCTGCAGCCTGTGCTACGGGACATGGAGAACAGCTGTTTGGGGATTGCGGGGACGGGCTGCTCTGCGTTTGGTGA
Q G I P Q G S I L S T L L C S L C Y G D M E N K L F A G I R R D G L L L R L V D

TGATTTCTGTGGTGACACCTCACCTCACCCAGCGAAACCTTCTCAGGACCTGGTCCGAGGTGCTCCTGAGTATGCTGCGTGGTGAACCTGCGGAAGACAGTGGTGAACCTCCC
D F L L V T P H L T H A K T F L R T L V R G V P E Y G C V V N L R K T V V N F P

TGTAGAAGACGAGGCCCTGGGTGGCAGGCTTTTGTTCAGATGCGGGCCACGGCCTATTCCCTGGTGGGCTGCTGCTGGATACCCGGACCTGGAGGTGCAGAGGCACTACTCCAG
V E D E A L G G T A F V Q M P A H G L F P W C G L L L D T R T L E V Q S D Y S S

CTATGCCCGGACCTCCATCAGAGCAGTCTCACCTTCAACCGCGGCTTCAAGGCTGGGAGGAACATGCTGCGAAACTCTTTGGGCTTTCGGCTGAAGTGTACAGCCTGTTTCTGGA
Y A R T S I R A S L T F N R G F K A G R N M R R K L F G V L R L K C H S L F L D

TTTGAGGTGAACAGCCTCCAGACGGTGTGCACCAACATCTACAAGATCCTCTGCTGCGAGGCTACAGGTTTACGCGATGTGTGCTGCAAGTCCCATTTTCATCAGCAAGTTTGAAGAA
L Q V N S L Q T V C T N I Y K I L L L Q A Y R F H A C V L Q L P F H Q Q V W K N

CCCCACATTTTCTGCGGTCATCTCTGACAGGCTCCCTCTGCTACTCCATCTGAAAGCCAGAAGCAGGGATGTGCTGGGGGCCAAGGGCGCCGCGGCTCTGCGCTCCGA
P T F F L R V I S D T A S L C Y S I L K A K N A E

CCGAAGAAAACATTTCTGCTGACTCTGCGGTGCTTGGGTC
E E N I L V V T P A V L G S

GGGACAGCCAGAGATGGAGCCACCCCGCAGACCGTGGGTGTGGGAGCTTTCCGGTGTCTCTGGGAGGGAGTTGGGCTGGGCTGTGACTCCTCAGCCTCTGTTTTCCCCCAG
G Q P E M E P P R R P S G V G S F P V S P G R G V G L G L *

Fig. 11N



Protein that lacks motif A

ATGCCGCGCGCTCCCCGCTGCCGAGCGTGGCTCCCTGCTGCCGAGCCACTACCGGAGGTGCTGCCGCTGGCCACGTTGCTG
M P R A P R C R A V R S L L R S H Y R E V L P L A T F V

CGGCGCTGGGGCCCCAGGGCTGGCGGCTGGTGACGCGCGGGGACCCGGCGGCTTTCCGCGCGTGGTGGCCAGTGCCCTGGTGTGCGTGCCCTGGGACGCACGGCCGCCCCCGCGC
R R L G P Q G W R L V Q R G D P A A F R A L V A Q C L V C V P W D A R P P P A A

CCCCCTCTCCGCCAGGTGCTGCTGAAGGAGCTGGTGGCCGAGTGCTGCAGAGGCTGTGCGAGCGCGCGGAAGAACGTGCTGGCCTTCGGCTTCGCGCTGCTGGACGGGGCCCG
P S F R Q V S C L K E L V A R V L Q R L C E R G A K N V L A F G F A L L D G A R

CGGGGGCCCCCGAGGCTTACCACAGCGTGGCAGCTACCTGCCAACACGGTGACGACGACTCGGGGGAGCGGGCGTGGGGGCTGCTGCTGCGCCGCTGGGCGACGACGT
G G P P E A F T T S V R S Y L P N T V T D A L R G S G A W G L L L R R V G D D V

GCTGGTTCACCTGCTGGCAGCTGCCGCTCTTTGCTGGTGGCTCCAGCTGCGCTACCAGGTGTGGGGCCGCGCTGTACCAGCTCGGCGCTGCCACTCAGGCCCGGGCCCCCGC
L V H L L A R C A L F V L V A P S C A Y Q V C G P P L Y Q L G A A T Q A R P P P

ACACGCTAGTGGACCCGAAGGCGTCTGGGATGCGAACGGGCTGGAACCATAGCTCAGGGAGCGGGGTCCCCCTGGGCTGCCAGCCCCGGGTGCGAGGAGCGCGGGGCGAGTGC
H A S G P R R R L G C E R A W N H S V R E A G V P L G L P A P G A R R R G G S A

CAGCGAAGTCTGCCGTTGCCAAGAGGCCAGGCGTGGCGCTGCCCTGAGCGGAGCGGACGCGGTTGGGCGAGGGTCTGGGCCACCCGGGCGAGACCGTGGACGAGTGACCG
S R S L P L P K R P R R G A A P E P E R T P V G Q G S W A H P G R T R G P S D R

TGGTTTCTGTGGTGTACCTGCCAGACCCGCGAAGAAGCCACCTCTTTGGAGGGTGGCTCTCTGGCAGCGCCACTCCACCCATCCGTGGGCGCCAGCACCAGCGGGGCCCCC
G F C V V S P A R P A E E A T S L E G A L S G T R H S H P S V G R Q H H A G P P

ATCCACATCGCGGCCACCACGCTCCCTGGGACAGCCTTGTCCCCGGGTGACGCCGAGACCAAGCACTTCTCTACTCTCAGGCGACAAGGAGCAGTGCGGGCCCTCTCTACTCAG
S T S R P P R P W D T P C P P V Y A E T K H F L Y S S G D K E Q L R P S F L L S

CTCTCTGAGGCGCAGCCTGACTGGCGCTCGGAGGCTCGTGAGACCATCTTTCTGGGTTCCAGGCCCTGGATGCCAGGGACTCCCGCAGGTTGCCCGCCTGCCCGAGCCTACTGGCA
S L R P S L T G A R R L V E T I F L G S R P W M P G T P R R L P R L P Q R Y W Q

AATCGGCCCCCTGTTTCTGGAGCTGCTTGGGAACACGCGCAGTGCCCCACGGGGTGTCTCTAAGACGCACTGCCGCTGCGAGCTGCGGTACCCAGCAGCCGGTGTCTGTGCCCG
M R P L F L E L L G N H A Q C P Y G V L L K T H C P L R A A V T P A A G V C A R

GGAGAAGCCCCAGGGCTCTGTGGCGCCCCGAGGAGGAGACAGACCCCGTGGCTGGTGACGCTGCTCCGCGAGCACAGACCCCTGGCAGGTGTACGGCTTCGTGGGGCCCTG
E K P Q G S V A A P E E E D T D P R R L V Q L L R Q H S S P W Q V Y G F V R A C

CCTGCGCGGCTGGTCCCCAGGCTCTGGGCTCCAGGCACAACGAACGCGCTTCTCAGGAACCAAGAAGTTTCATCTCCCTGGGAAGCATGCCAAGCTCTCGTGCAGGAGCT
L R R L V P P G L W G S R H N E R R F L R N T K K F I S L G K H A K L S L Q E L

GACGTGAAGATGAGCGTGGGACTGCGCTTGGCTGCGCAGGAGCCAGGGGTGGCTGTGTCCGGCGCAGAGCACCCTGCGTGAGGAGATCTGGCCAAAGTCTCTGCACTGGCT
T W K M S V R D C A W L R R S P G V G C V P A A E H R L R E E I L A K F L H W L

GATGAGTGTACGCTGCGAGCTGCTCAGGCTCTTTCTTTATGTACGGAGACCAGGTTTCAAAGAAGAGGCTCTTTTCTACCGGAAGAGTGTCTGGAGCAAGTTCAAAGCATTGG
M S V Y V V E L L R S F F Y V T E T T F Q K N R L F F Y R K S V W S K L Q S I G

Fig. 110

AATCAGACAGCACTTGAAGAGGGTGCAGCTGCCGGAGCTGTTCGGAAGCAGAGGTCAGGCAGCATCGGGAAGCCAGGCCCGCCCTGCTGACGTCCAGACTCCGCTTCATCCCCAAGCCTGA
I R Q H L K R V Q L R E L S E A E V R Q H R E A R P A L L T S R L R F I P K P D

CGGGCTGCGGCCGATTGTGAACATGGACTACGTCGTGGGAGCCAGAACGTTCCGCAGAGAAAAGAGGGCCGAGCGTCTCACCTCGAGGGTGAAGGCACTGTTACAGCGTGCTCAACTACGA
G L R P I V N M D Y V V G A R T F R R E K R A E R L T S R V K A L F S V L N Y E

GCGGGCGCGGCCCGCCCGGCTCTCTGGGCGCTCTGTGCTGGGCTGGACGATATCCACAGGGCTGCGGCACCTTCGTGCTGCGTGTGCGGGCCAGGACCCGCCCTGAGCTGACTT
R A R R P G L L G A S V L G L D D I H R A W R T F V L R V R A Q D P P P E L Y F

TGTC AAG GACAGGCTCACGGAGTGCATGCCAGCATCATCAAACCCAGAACACGTA CTGCGTGC GTGGTATGCCGTGGTCCA
V K D R L T E V I A S I I K P Q N T Y C V R R Y A V V Q

GAAGGCCGCCCATGGGCACGTCCGCAAGGCTTCAAGAGCCACGTCTCTACCTTGACAGACCTCCAGCGTACATGCGACAGTTCGTGGCTCACCTGCAGGAGACCAGCCCGCTGAGGGA
K A A H G H V R K A F K S H V S T L T D L Q P Y M R Q F V A H L Q E T S P L R D

TGCGCTGTCATCGACGAGAGCTCTCTCTGAATGAGGCCAGCAGTGGCTCTTCGACGCTTCTCTACGCTTCATGTGCCACCACGCGTGGCATCAGGGGCAAGTCTACGTCCAGTG
A V V I E Q S S S L N E A S S G L F D V F L R F M C H H A V R I R G K S Y V Q C

CCAGGGGATCCCGCAGGGCTCCATCTCTCCACGCTGCTCTGCAGCCTGTGCTACGGCGACATGGAGAACAAGCTGTTTGGGGGATTGCGCGGACGGGCTGCTCTCGGTTTGGTGGGA
Q G I P Q G S I L S T L L C S L C Y G D M E N K L F A G I R R D G L L L R L V D

TGATTTCTTGTGGTGACACCTCACCTCACCCACGCGAAAACCTTCTCAGGACCTGGTCCGAGGTGTCCTGAGTATGGCTGCGTGGTGAACCTGCGGAAGACAGTGGTGAACCTCCC
D F L L V T P H L T H A K T F L R T L V R G V P E Y G C V V N L R K T V V N F P

TGTAGAAGACGAGGCCCTGGGTGGCAGGCTTTTGTTCAGATGCCGGCCACGGCTATTCCCTGGTGGCGCTGCTGCTGGATACCCGGACCTGGAGGTGCAGAGCGACTACTCCAG
V E D E A L G G T A F V Q M P A H G L F P W C G L L L D T R T L E V Q S D Y S S

CTATGCCCGGACCTCCATCAGAGCCAGTCTCACCTTCAACCGGGCTTCAAGGCTGGGAGGAACATGCGTCGCAAACTCTTTGGGGTCTTGGCGCTGAAGTGTACAGCCTGTTTCTGGA
Y A R T S I R A S L T F N R G F K A G R N M R R K L F G V L R L K C H S L F L D

TTTGCAGGTGAACAGCCTCCAGACGGTGTGCACCAACATCTACAAGATCTCTGCTGCAGGCGTACAGGTTTACGCATGTGTGCTGCAGCTCCCATTTTCATCAGCAAGTTTGAAGAA
L Q V N S L Q T V C T N I Y K I L L L Q A Y R F H A C V L Q L P F H Q Q V W K N

CCCCACATTTTCTGCGGTCTCTGACAGGCTCTCTGCTACTCCATCTGAAAGCCAAGAAGCAGGGATGTGCTGGGGGCCAAGGGCGCCGCCCTCTGCCCTCCGA
P T F F L R V I S D T A S L C Y S I L K A K N A G M S L G A K G A A G P L P S E

GGCCGTGCAGTGGTGTGCCACCAAGCATTCTGCTCAAGCTGACTCGACACCGTGCACCTACGTGCCACTCTGGGGTCACTCAGGACAGCCAGACGCAGTGAGTCGGAAGCTCCC
A V Q W L C H Q A F L L K L T R H R V T Y V P L L G S L R T A Q T Q L S R K L P

GGGGACGACGCTGACTGCCCTGGAGGCCGACGCAACCCGGCACTGCCCTCAGACTTCAAGACCATCTGGACTGATGGCCACCCGCCACAGCCAGGCCGAGAGCAGACACCAGCAGCC
G T T L T A L E A A A N P A L P S D F K T I L D

CTGTACGCGCGGGCTCTACGTCCCAGGGAGGGAGGGGCGGCCACACCCAGGCCCGCACCGCTGGGAGTCTGAGGCCTGAGTGAGTGTGTTGGCCGAGGCCTGCATGTCCGGCTGAAGGCT
GAGTGTCCGGCTGAGGCCTGAGCGAGTGTCCAGCAAGGGCTGAGTGTCCAGCACACCTGCCGTCTCACTTCCCACAGGCTGGCGCTCGGCTCCACCCAGGGCGAGCTTTTCTCAC

CAGGAGCCCGGCTTCCACTCCCCACATAGGAATAGTCCATCCCCAGATTGCCATTGTTCAACCTCGCCCTGCCCTCTTTGCTTCCACCCCAACCATCCAGGTGGAGACCTGAGAA

Fig. 11P



GGACCTGGGAGCTCTGGGAATTTGGAGTGACCAAGGTGTGCCCTGTACACAGGCGAGGACCTGCACCTGGATGGGGTCCCTGTGGGTCAAATTGGGGGAGGTGCTGTGGGAGTAA
AATACTGAATATATGAGTTTTTCAGTTTTGA

Fig. 11Q



Truncated protein that lacks motif A

ATGCCGCGCGCTCCCGCTGCCGAGCGTGGCGTCCCTGCTGCGCAGCCACTACCGCGAGGTGCTGCCGCTGGCCACGTTCTGTG
M P R A P R C R A V R S L L R S H Y R E V L P L A T F V

CGGCGCTGGGGCCCCAGGGCTGGGGCTGGTGACGCGGGGACCCGGCGGCTTTCCGCGCGTGGTGGCCAGTGCCGTGGTGTGCGTGGCCGGACGACGGCCGCCCCCGCGC
R R L G P Q G W R L V Q R G D P A A F R A L V A Q C L V C V P W D A R P P P A A

CCCCCTCTCCGCGAGGTGCTGCTGAAGGAGCTGGTGGCCGAGTGCTGAGAGGCTGTGCGAGCGCGGCGGAAGAAGCTGCTGGCCTTCGGCTTCGCGTGTGGACGGGGCCCG
P S F R Q V S C L K E L V A R V L Q R L C E R G A K N V L A F G F A L L D G A R

CGGGGGCCCCCGAGGGCTTACCACGAGCGTGGCAGCTACCTGCCAACACGGTGACGACGCACTGCGGGGAGCGGGCGTGGGGCTGCTGCTGCGCGCGTGGGCGACGACGT
G G P P E A F T T S V R S Y L P N T V T D A L R G S G A W G L L L R R V G D D V

GCTGGTTACCTGCTGGCAGCTGCGCGCTCTTTGTGCTGGTGGCTCCAGCTGCGCCTACCAGGTGTGGGGCGCGCGTGTACCAGCTCGGCGCTGCCACTCAGGCCGGCCCCCGCC
L V H L L A R C A L F V L V A P S C A Y Q V C G P P L Y Q L G A A T Q A R P P P

ACACGCTAGTGGACCCCGAAGCGTCTGGGATGCGAACGGGCTGGAACCATAGCGTCAGGAGGGCGGGGTCCCTTGGGCTGCCAGCCCCGGGTGCGAGGAGCGGGGGCAGTGC
H A S G P R R R L G C E R A W N H S V R E A G V P L G L P A P G A R R R G G S A

CAGCGAAGTCTGCCGTTGCCAAGAGGCCAGGCGTGGCGCTGCCCTGAGCGGAGCGGACGCCGTTGGGCGAGGGTCTGGGCCACCCGGGCGAGGACGCGTGGACGAGTGACCG
S R S L P L P K R P R R G A A P E P E R T P V G Q G S W A H P G R T R G P S D R

TGGTTTCTGTGGTGTACCTGCCAGACCCGCGAAGAAGCCACCTCTTTGGAGGGTGGCTCTCTGGCACGCGCACTCCACCCATCCGTGGGCCGCGCAGCACCACGCGGGCCCCC
G F C V V S P A R P A E E A T S L E G A L S G T R H S H P S V G R Q H H A G P P

ATCCACATCGCGCCACCAGTCCCTGGGACACGCTTGTCCCCGGTGACGCCGAGACCAAGCACTTCTCTACTCCTCAGGCGACAAGGAGCAGCTGCGGCCCTCTTCTACTCAG
S T S R P P R P W D T P C P P V Y A E T K H F L Y S S G D K E Q L R P S F L L S

CTCTCTGAGGCCAGCCTGACTGGCGCTCGGAGGCTCGTGGAGACCATCTTTTGGGTTCCAGGCCCTGGATGCCAGGACTCCCGCAGGTTGCCCGCCTGCCCGAGCCTACTGGCA
S L R P S L T G A R R L V E T I F L G S R P W M P G T P R R L P R L P Q R Y W Q

AATCGGGCCCTGTTTCTGGAGCTGCTGGGAACACGCGCAGTGGCCCTACGGGGTGTCTCTCAAGACGCACTGCCGCTGCGAGCTGCGGTACCCAGCAGCGGTGTCTGTGCCG
M R P L F L E L L G N H A Q C P Y G V L L K T H C P L R A A V T P A A G V C A R

GGAGAAGCCCCAGGGCTCTGTGGCGGGCCCCGAGGAGGAGACAGACCCCGTGGCTGGTGCAGTGTCTGCCAGCAGCAGCCCTGGCAGGTGTACGGCTTCTGTGGCGGCTG
E K P Q G S V A A P E E E D T D P R R L V Q L L R Q H S S P W Q V Y G F V R A C

CCTGCGCGGCTGGTGGCCCCAGGCTCTGGGGCTCCAGGCACAACGACCGCTTCTCAGGAACACCAAGAAGTTCATCTCCCTGGGAAGCATGCCAAGCTCTGCTGCAGGAGCT
L R R L V P P G L W G S R H N E R R F L R N T K K F I S L G K H A K L S L Q E L

GACGTGAAGATGAGCTGCGGACTGCGCTTGGCTGCGCAGGAGCCAGGGGTTGGCTGTGTTCCGGCCGAGAGCACCCTGCGTGAGGAGATCTGGCCAAGTTCCTGCACTGGCT
T W K M S V R D C A W L R R S P G V G C V P A A E H R L R E E I L A K F L H W L

GATGAGTGTGTACGTCGTGAGCTGCTCAGGTCTTTCTTTTATGTACGGAGACCAGTTTCAAAGAAGAGGCTCTTTTCTACCGGAAGAGTGTCTGGAGCAAGTTGCAAAGCATGG
M S V Y V V E L L R S F F Y V T E T T F Q K N R L F F Y R K S V W S K L Q S I G

Fig. 11R



AATCAGACAGCACTTGAAGAGGGTGCAGCTGCGGGAGCTGTGGAAGCAGAGGTGAGGCAGCATCGGAAGCCAGGCCCGCCCTGCTGACGTCCAGACTCCGCTTCATCCCAAGCCTGA
I R Q H L K R V Q L R E L S E A E V R Q H R E A R P A L L T S R L R F I P K P D

CGGGCTGCGGCCGATTGTGAACATGGACTACGTGCGGGAGCCAGAAGCTTCGCGAGAGAAAAGAGGCCGAGCGTCTCACCTCGAGGGTGAAGGCACTGTTGAGCGTGTCAACTACGA
G L R P I V N M D Y V V G A R T F R R E K R A E R L T S R V K A L F S V L N Y E

GCGGGCGCGGCCCGCCGCTCTGCGGGCCTGTGCTGGGCTGGACGATATCCAGGGCCTGGCGCACCTTCGTGCTGCGTGTGCGGGCCAGGACCCGCGCCTGAGCTGTACTT
R A R R P G L L G A S V L G L D D I H R A W R T F V L R V R A Q D P P P E L Y F

TGTCAAG
V K

GACAGGCTCAGGAGGTGATCGCCAGCATCATAAACCCAGAACGTAAGTGTGCGTGTGCGGTGCGGTATGCCGTGCTCA
D R L T E V I A S I I K P Q N T Y C V R R Y A V V Q

GAAGGCCGCCCATGGGCAGCTCCGCAAGGCCTTCAAGAGCCAGTCTCTACCTTGACAGACCTCCAGCCGTACATGCCAGAGTTCGTGGCTCACCTGCAGGAGACGAGCCGCTGAGGGA
K A A H G H V R K A F K S H V S T L T D L Q P Y M R Q F V A H L Q E T S P L R D

TGCCGTGTCATCGAGCAGAGCTCCTCCCTGAATGAGGCCAGCAGTGGCCTCTTCGACGCTCTCTACGCTTCATGTGCCACACGCCGTGCGCATCAGGGGCAAGTCTACGTCCAGTG
A V V I E Q S S S L N E A S S G L F D V F L R F M C H H A V R I R G K S Y V Q C

CCAGGGGATCCCGAGGGCTCCATCCTCTCCAGCTGCTCTGCAGCCTGTGCTACGGCGACATGGAGAACAAGCTGTTTGGGGGATTGCGGGGACGGGCTGCTCCTGCGTTTGGTGGA
Q G I P Q G S I L S T L L C S L C Y G D M E N K L F A G I R R D G L L L R L V D

TGATTTCTGTTGGTGACACCTCACCTCACCCACGCGAAAACCTTCTCAGGACCCTGGTCCGAGGTGTCCCTGAGTATGGCTGCGTGGTGAAGTTCGGAAGACAGTGGTGAAGTTCCTC
D F L L V T P H L T H A K T F L R T L V R G V P E Y G C V V N L R K T V V N F P

TGTAGAAGACGAGGCCCTGGGTGGCAGGCTTTTGTTCAGATGCCGGCCACGCGCTATTCCTGCGTGGCCTGCTGCTGGATACCGGACCCTGGAGGTGACAGCGACTACTCCAG
V E D E A L G G T A F V Q M P A H G L F P W C G L L L D T R T L E V Q S D Y S R

GTGAGCGCACCTGGCCGGAAGTGGAGCCTGTGCCGGCTGGGGCAGGTGCTGCTGCAGGGCCGTGCGTCCACCTCTGCTTCGCTGTGGGGCAGGCGACTGCCAATCCCAAGGGTCAGA
*

TGCCACAGGGTGCCCTCGTCCCATCTGGGGCTGAGCACAAATGCATCTTTCTGTGGGAGTGAGGGTGCCCTCACAACGGGAGCAGTTTTCTGTGCTATTTTGGTAA...

Fig. 11S



Lacks motif A and altered C-terminus

ATGCCGCGCGCTCCCGCTGCCGAGCGGTGCGCTCCCTGCTGCGCAGCCACTACCGGAGGTGCTGCCGTGCCACGTTCTGTG
M P R A P R C R A V R S L L R S H Y R E V L P L A T F V

CGGCGCTGGGGCCCCAGGGCTGGCGGCTGGTGACGCGGGGACCCGGCGCTTTCCGCGCTGGTGCCCACTGCTGGTGTGCTGCCCTGGGACGCACGGCGCCCCCGCGCG
R R L G P Q G W R L V Q R G D P A A F R A L V A Q C L V C V P W D A R P P P A A

CCCCCTCTCCGCCAGGTGTCTGCTGAAGGAGCTGGTGGCCGAGTGCTGACAGGCTGTGCGAGCGCGGCGGAAGAACGTGCTGGCTTCGGCTTCGCGCTGCTGGACGGGGCCCG
P S F R Q V S C L K E L V A R V L Q R L C E R G A K N V L A F G F A L L D G A R

CGGGGGCCCCCGAGGCTTACCACACGCTGCCGAGCTACTGCCAACACGGTGACCGACGCTGCGGGGAGCGGGCGTGGGGCTGCTGCTGCGCGCTGGGCGACGACGT
G G P P E A F T T S V R S Y L P N T V T D A L R G S G A W G L L L R R V G D D V

GCTGTTTCACTGCTGGCAGCTGCCGCTCTTTGTGCTGGTGGCTCCAGCTGCCCTACCAGGTGTGCGGGCGCGCTGTACCAGCTCGGCGTGGCACTCAGGCCGGGGCCCCCGC
L V H L L A R C A L F V L V A P S C A Y Q V C G P P L Y Q L G A A T Q A R P P P

ACACGCTAGTGACCCCCGAAGGCTCTGGGATGCGAACGGGCTGGAACCATAGCTCAGGGAGGCGGGGTCCCTGGGCTGCCAGCCCCGGGTGCGAGGAGCGGGGGCAGTGC
H A S G P R R R L G C E R A W N H S V R E A G V P L G L P A P G A R R R G G S A

CAGCGAAGTCTGCCGTTGCCAAGAGGCCAGGCGTGGCGTGGCCCTGAGCCGAGCGGACGCCGTTGGGCGAGGGTCTGGGCGCACCCGGGCGAGGCGGTGGACGAGTGACCG
S R S L P L P K R P R R G A A P E P E R T P V G Q G S W A H P G R T R G P S D R

TGGTTTCTGTGTGTACCTGCCAGACCCGCCGAAGAAGCCACCTCTTTGAGGGTGCGCTCTCTGCGACGCGCACTCCACCCATCCGTGGGCGCCAGCACCACGGGGCCCCC
G F C V V S P A R P A E E A T S L E G A L S G T R H S H P S V G R Q H H A G P P

ATCCACATCGGGCCACCACGCTCCCTGGGACACGCTTGTCCCCGGGTGACGCCGAGACCAAGCACTTCTCTACTCTCAGGCGACAAGGAGAGCTGCGGCGCTCTCTCTACTCAG
S T S R P P R P W D T P C P P V Y A E T K H F L Y S S G D K E Q L R P S F L L S

CTCTGAGGCGCAGCTGACTGGCGCTCGGAGGCTCGTGAGACCATCTTTCTGGGTCCAGGCGCTGGATGCCAGGGACTCCCGCAGGTTGCCCGCTGCCCGAGCGTACTGGCA
S L R P S L T G A R R L V E T I F L G S R P W M P G T P R R L P R L P Q R Y W Q

AATGCGGCCCTGTTTCTGGAGCTGCTTGGGAACACGCGCAGTGCCCTACGGGTGCTCTCAAGACGCACTGCCGCTGCGAGCTGCGGTACCCCGAGCAGCGGTGTCTGTGCCG
M R P L F L E L L G N H A Q C P Y G V L L K T H C P L R A A V T P A A G V C A R

GGAGAAGCCCCAGGCTCTGTGGCGGGCCCCGAGGAGGAGACAGACCCCGTGGCTGGTGACGTGCTCCGCCAGCAGCAGCCCCCTGGCAGGTGTACGGCTTCTGCGGGCGCTG
E K P Q G S V A A P E E E D T D P R R L V Q L L R Q H S S P W Q V Y G F V R A C

CCTGCGCGGCTGGTGCCCCAGGCTCTGGGGCTCCAGGCACAACGAACGCCGCTTCTCAGGAACACCAAGAAGTTATCTCCCTGGGGAAGCATGCCAAGCTCTCGTGCAGGAGCT
L R R L V P P G L W G S R H N E R R F L R N T K K F I S L G K H A K L S L Q E L

GACGTGAAGATGAGCTGCGGGAAGTGGCTTGGCTGCGCAGGAGCCAGGGGTGGCTGTGTTCCGGCGCAGAGCAGCGTCTGCGTGAGGAGATCTGGCAAGTTCTGCACTGGCT
T W K M S V R D C A W L R R S P G V G C V P A A E H R L R E E I L A K F L H W L

GATGAGTGTACGTGCTGAGCTGCTCAGGTCTTTCTTTATGTACGGAGACACGTTTCAAGAAGCAGGCTCTTTTCTACCGGAAGAGTGTCTGGAGCAAGTTGCAAGCATTGG
M S V Y V V E L L R S F F Y V T E T T F Q K N R L F F Y R K S V W S K L Q S I G

Fig. 11T



AATCAGACAGCACTTGAAGAGGGTGCAGCTGCGGGAGCTGTGGAAGCAGAGGTCAGGCAGCATCGGGAAGCCAGGCCGCCCTGCTGACGTCCAGACTCCGCTTCATCCCCAAGCCTGA
I R Q H L K R V Q L R E L S E A E V R Q H R E A R P A L L T S R L R F I P K P D
CGGGCTGCGGCCGATTGTGAACATGGACTACGTGCTGGGAGCCAGAACGTTCCGAGAGAAAAGAGGGCGAGCGTCTACCTCGAGGGTGAAGGCAGTGTTCAGCGTCTCAACTACGA
G L R P I V N M D Y V V G A R T F R R E K R A E R L T S R V K A L F S V L N Y E
GCGGGCGCGGCCCGGCCCTCTGCGGCCCTGTGCTGGGCCCTGGACGATATCCAGGGCCTGGCGACCTTCGTGCTGCGTGTGCGGGCCAGGACCGCGGCCCTGAGCTGTACTT
R A R R P G L L G A S V L G L D D I H R A W R T F V L R V R A Q D P P P E L Y F
TGTC AAG GACAGGCTCAGGAGGTCATGCCAGCATCATCAAAACCCAGAACAGTACTGCGTGCCTGGTATGCCGTGGTCCA
V K D R L T E V I A S I I K P Q N T Y C V R R Y A V V Q
GAAGGCCGCCATGGGCAGTCCGCAAGGCCTTCAAGAGCCAGTCTCTACCTTGACAGACCTCCAGCGTACATGCGACAGTTCTGCTGCTCACCTGCAGGAGACCAGGCCGCTGAGGGA
K A A H G H V R K A F K S H V S T L T D L Q P Y M R Q F V A H L Q E T S P L R D
TGCCGTGCTATCGAGCAGAGCTCCTCCTGAATGAGGCCAGCAGTGGCCTTTCGACGTCTTCTACGCTTCATGTGCCACCACGCCGTGCGCATCAGGGGCAAGTCTACGTCCAGTG
A V V I E Q S S S L N E A S S G L F D V F L R F M C H H A V R I R G K S Y V Q C
CCAGGGGATCCGCGAGGGCTCCATCCTCTCCACGCTGCTCTGACGCTGTGCTACGGCGACATGGAGAACAAGCTGTTTGGGGGATTGCGGGGACGGGCTGCTCCTGCGTTTGGTGA
Q G I P Q G S I L S T L L C S L C Y G D M E N K L F A G I R R D G L L L R L V D
TGATTTCTGTGGTGACACCTCACCTCACCCACGCGAAAACCTTCTCAGGACCTGGTCCGAGGTGTCCCTGAGTATGGCTGCGTGGTGAACCTGCGGAAGACAGTGGTGAACCTCCC
D F L L V T P H L T H A K T F L R T L V R G V P E Y G C V V N L R K T V V N F P
TGTAAGACGAGGCCCTGGGTGGCAGGCTTTTGTTCAGATGCCGGCCACGGCCTATTCCCTGGTGGGCTGCTGCTGGATACCCGGACCTGGAGGTGCAGAGCCGACTACTCCAG
V E D E A L G G T A F V Q M P A H G L F P W C G L L L D T R T L E V Q S D Y S S
CTATGCCCGGACCTCCATCAGAGCCAGTCTCACCTTCAACCGCGGCTTCAAGGCTGGGAGGAACATGCGTCGCAAACTCTTTGGGGTCTTGGGCTGAAGTGTACAGCCTGTTTCTGGA
Y A R T S I R A S L T F N R G F K A G R N M R R K L F G V L R L K C H S L F L D
TTTGAGGTGAACAGCCTCCAGACGGTGTGCACCAACATCTACAAGATCCTCCTGCTGAGGCGTACAGGTTTACGCATGTGTGCTGACGCTCCCATTTTCATCAGCAAGTTTGAAGAA
L Q V N S L Q T V C T N I Y K I L L L Q A Y R F H A C V L Q L P F H Q Q V W K N
CCCCACATTTTCTGCGGTCTCTGACACGGCCTCCCTGCTACTCCATCCTGAAAGCAAGAACGAGGGATGTCGCTGGGGGCCAAGGGCGCGCGGCCCTCTGCCCTCCGA
P T F F L R V I S D T A S L C Y S I L K A K N A E

CCGAAGAAAACATTTCTGCTGACTCCTGCGGTGCTTGGGTG
E E N I L V V T P A V L G S

GGGACAGCCAGAGATGGAGCCACCCGACACCGTGGGTGTGGGAGCTTTCCGGTGTCTCTGGGAGGGAGTTGGGCTGGGCTGTGACTCCTCAGCCTCTGTTTTCCCCCAG
G Q P E M E P P R R P S G V G S F P V S P G R G V G L G L *

Fig. 11U



Truncated telomerase (ver. 2)

ATGCCGCGCGCTCCCGCTGCCGAGCGTGCCTCCCTGCTGCGCAGCCACTACCGCGAGGTGCTGCCGCTGCCACGTTCCGTG
M P R A P R C R A V R S L L R S H Y R E V L P L A T F V

CGGCGCTGGGGCCCCAGGGCTGGCGCTGGTGACGCGCGGGGACCGCGGCTTTCCGCGCTGGTGGCCAGTGCCTGGTGTGCTGCCCTGGGACGACGGCGCCCCCGCGCG
R R L G P Q G W R L V Q R G D P A A F R A L V A Q C L V C V P W D A R P P P A A

GGCTCCCCGGGTCGGCTCCGGCTGGGGTTGAGGGCGCGCGGGGAACAGCGACATGCGGAGAGCAGCGCAGGCGACTCAGGGCGCTCCCCCGCAGGTG
G L P G V G V R L G L R A A G G N Q R H A E S S A G D S G R F P R R
A S P G S A S G W G * G R P G G T S D M R R A A Q A T O G A S P A G
P P R G R R P A G V E G G R G E P A T C G E Q R R R L R A L P P Q V

CCCCCTCTCCGCGAGGTGCTGCTGCTGAAGGAGCTGGTGGCCCGAGTGTGACAGGCTGTGCGAGCGCGGCGCAAGAACGTGCTGGCTTCGGCTTCGCGTGTGACGGGGCCCCG
P S F R Q V S C L K E L V A R V L Q R L C E R G A K N V L A F G F A L L D G A R

CGGGGGCCCCCGAGGCTTACCACAGCGTGCAGCTACCTGCCCAACAGGTGACCGACGCACTGCGGGGAGCGGGGCTGGGGGCTGCTGCGCGCGGTGGGCGACGACGT
G G P P E A F T T S V R S Y L P N T V T D A L R G S G A W G L L L R R V G D D V

GCTGTTACCTGCTGCGACGCTGCGCGCTTTTGTGCTGGTGGCTCCAGCTGCGCTACAGGTGTGCGGGCGCGCGCTGTACCAGCTCGGCGCTGCCACTCAGGCCCGGGCCCCCGC
L V H L L A R C A L F V L V A P S C A Y Q V C G P P L Y Q L G A A T Q A R P P P

ACACGCTAGTGGACCCGAAGCGCTGCGGATGCGAACGGGCTGGAACCATAGCGTACGGAGGGCGGGGTCCCCCTGGGCTGCCAGCCCCGGGTGCGAGGAGCGCGGGGCGAGTGC
H A S G P R R R L G C E R A W N H S V R E A G V P L G L P A P G A R R R G G S A

CAGCCGAAGTCTGCCGTTGCCAAGAGCGCCAGGCGTGGCGCTGCCCTGAGCGGAGCGGACCGCGTTGGGCGAGGGTCTGGGCCCCACCGGGCAGGACGCTGGACCGAGTGACCG
S R S L P L P K R P R R G A A P E P E R T P V G Q G S W A H P G R T R G P S D R

TGTTTCTGTGTGTGTCACCTGCCAGACCGCGAAGAAGCCACCTCTTTGGAGGTGCGCTCTCTGGCACGCGCACTCCACCCATCCGTGGGCGCGCAGCACCACGGGGCCCCC
G F C V V S P A R P A E E A T S L E G A L S G T R H S H P S V G R Q H H A G P P

ATCCACATCGCGCCACACGCTCCCTGGGACACGCTTGTCCCCGGTGTACGCGGAGACCAAGCACTTCTCTACTCTCAGGCGACAAGGAGAGCTGCGGCCCCCTCTCTACTCAG
S T S R P P R P W D T P C P P V Y A E T K H F L Y S S G D K E Q L R P S F L L S

CTCTCTGAGGCGCAGCCTGACTGGCGCTCGGAGGCTCGTGAGACCATTTTCTGGGTCCAGGCGCTGGATGCCAGGACTCCCCGAGGTGCCCGGCTGCCCGAGCGCTACTGGCA
S L R P S L T G A R R L V E T I F L G S R P W M P G T P R R L P R L P Q R Y W Q

AATCGGCCCCCTGTTTCTGGAGCTGCTTGGGAACACGCGCAGTGCCCCACGGGTGCTCTCAAGACGCACTGCCGCTGCGAGCTGCGGTACCCAGCAGCGGCTGTGTGCCCCG
M R P L F L E L L G N H A Q C P Y G V L L K T H C P L R A A V T P A A G V C A R

GGAGAAGCCCCAGGCTGTGTGGCGGCCCCGAGGAGGAGACAGACCCCCGCTGCTGGTGCAGCTGTCTCCGCGACACAGCGCCCTGGCAGGTGTACGGCTTCGTGCGGGCTG
E K P Q G S V A A P E E E D T D P R R L V Q L L R Q H S S P W Q V Y G F V R A C

CCTGCGCGGCTGGTCCCCAGGCTCTGGGGCTCAGGACACAACGCGCTTCTCTCAGGAACCAAGAAGTTTCTCTCCCTGGGAAGCATGCCAAGCTCTCGCTGCAGGAGCT
L R R L V P P G L W G S R H N E R R F L R N T K K F I S L G K H A K L S L Q E L

Fig. 11V



GACGTGGAAGATGAGCGTGGGGACTGCGCTTGGCTGCGCAGGAGCCCAGGGGTTGGCTGTGTTCCGGCCGAGAGCACCGTCTGCGTGAGGAGATCCTGGCCAAGTTCCTGCACTGGCT
T W K M S V R D C A W L R R S P G V G C V P A A E H R L R E E I L A K F L H W L
GATGAGTGTGTACGTCGTCGAGCTGCTCAGGTCTTTCTTTATGTCACGGAGACCACGTTTCAAAGAACAGGCTCTTTTCTACCGGAAGAGTGTCTGGAGCAAGTTGCAAAGCATTGG
M S V Y V V E L L R S F F Y V T E T T F Q K N R L F F Y R K S V W S K L Q S I G
AAT--NNN--GACAGTCACCAGGGGGTTGACCGCGGACTGGGCGTCCCAGGGTTGACTATAGGACCAGGTGTCCAGGTGCCCTGCAAGTAGAGGGGCTCTCAGAGCGCTCTGGCTGG
CATGGGTGGACGTGGCCCCGGGCATGGCCTTCTGCGTGTGCTGCCGTGGGTGCCCTGAGCCCTCACTGAGTCGGTGGGGGCTTGTGGCTTCCCGTGAGCTTCCCCCTAGTCTGTTGTCTG
GCTGAGCAAGCCTCCTGAGGGGCTCTCTATTG...

Fig. 11W



Truncated protein 1 (ver. 2)

ATGCCGCGCGCTCCCGCTGCCGAGCCGTCGCGCTCCCTGCTGCGCAGCCACTACCGCGAGGTGCTGCCGTGGCCACGTTCTGT
M P R A P R C R A V R S L L R S H Y R E V L P L A T F V

CGGCGCTGGGGCCCCAGGGCTGGCGGCTGGTGACGCGGGGACCGGGCGGCTTCCGCGCGCTGGTGCCAGTGCTGGTGTGCGTGCCCTGGGACGACGGCCCGCCCCCGCCG
R R L G P Q G W R L V Q R G D P A A F R A L V A Q C L V C V P W D A R P P P A A

GGCCTCCCCGGGGTCCGGCTCCGGCTGGGGTTGAGGGCGGGCGGGGGAACAGCGACATGCGGAGAGCAGCGCAGGCGACTCAGGGCGCTTCCCCCGCAGGTG
G L P G V G V R L G L R A A G G N Q R H A E S S A G D S G R F P R R
A S P G S A S G W G * G R P G G T S D M R R A A Q A T Q G A S P A G
P P R G R R P A G V E G G R G E P A T C G E Q R R R L R A L P P Q V

CCCCCTCTCCGCGAGGTGCTGCTGAAGGAGCTGGTGGCCGAGTGCTGACAGGCTGTGCGAGCGCGGCGGAAGAACGTGCTGGCTTCGGCTTCGCGTGTGACGGGGCCCG
P S F R Q V S C L K E L V A R V L Q R L C E R G A K N V L A F G F A L L D G A R

CGGGGGCCCCCGAGGCTTACCACAGCGTGCGCAGCTACCTGCCCAACAGGTGACCGACGCACTGCGGGGAGCGGGGCGTGGGGCTGCTGCTGCGCGCGTGGGCGACGACGT
G G P P E A F T T S V R S Y L P N T V T D A L R G S G A W G L L L R R V G D D V

GCTGGTTCACGTGCTGGCAGCTGCGCGCTTTTGTGCTGGTGGCTCCAGCTGCGCTACCAAGGTGTGCGGGCCCGCGCTGTACCAGCTCGGCGCTGCCACTCAGGCCCGCCCCCGCC
L V H L L A R C A L F V L V A P S C A Y Q V C G P P L Y Q L G A A T Q A R P P P

ACACGCTAGTGGACCCGAAGCGCTCTGGGTGCGAACGGGCTGGAACCATAGCGTCAGGAGGGCGGGGTCCTCCCTGGGCTGCCAGCCCCGGGTGCGAGGAGGCGGGGGCAGTGC
H A S G P R R R L G C E R A W N H S V R E A G V P L G L P A P G A R R R G G S A

CAGCCGAAGTCTGCCGTGCCAAGAGGCCAGGCGTGGCGCTGCCCCGAGCGGAGCGGACCGCGTGGGCGAGGGTCTGGGCCACCGGGGAGGACGCGTGGACCGAGTGACCG
S R S L P L P K R P R R G A A P E P E R T P V G Q G S W A H P G R T R G P S D R

TGTTTTCTGTGTGTACCTGCCAGACCCGCGAAGAAGCCACCTCTTTGAGGGTGGCGCTCTGTGCGACGCGCACTCCACCCATCCGTGGGCGCCAGCACACGGGGCCCCC
G F C V V S P A R P A E E A T S L E G A L S G T R H S H P S V G R Q H H A G P P

ATCCACATCGCGGCCACACGCTCCCTGGGACACGCTTGTCCCCGGGTGACGCGAGACCAAGCACTTCTCTACTCTCAGGCGACAAGGAGAGCTGCGGCCCTCCTTCTACTCAG
S T S R P P R P W D T P C P P V Y A E T K H F L Y S S G D K E Q L R P S F L L S

CTCTGAGGCCAGCCTGACTGGCGCTCGGAGGCTCGTGAGACCATCTTTCTGGGTTCAGGCCCTGGATGCCAGGGACTCCCCGAGGTTGCCCGCTGCCAGCGCTACTGGCA
S L R P S L T G A R R L V E T I F L G S R P W M P G T P R R L P R L P Q R Y W Q

AATGCGGCCCTGTTCTGGAGCTGCTTGGAAACACGCGCAGTGCCCTACGGGTGCTCCTAAGACGCACTGCCGCTGCGAGCTGCGGTACCCCGACGCGCGGTGTGTGTGCCG
M R P L F L E L L G N H A Q C P Y G V L L K T H C P L R A A V T P A A G V C A R

GGAGAAGCCCCAGGGCTCTGTGGCGGGCCCCGAGGAGGAGACAGACCCCGTGGCTGGTGAGCTGCTCCGCCAGCACAGCAGCCCTGGCAGGTGTACGGCTTCGTGCGGGCTG
E K P Q G S V A A P E E E D T D P R R L V Q L L R Q H S S P W Q V Y G F V R A C

CTGCGCGCGCTGGTGCCCCAGGCTCTGGGGCTCCAGGCACAACGAACCGCTTCTCAGGAACCAAGAAGTTCTCTCCCTGGGGAAGCATGCCAAGCTCTCGTGCAGGAGCT
L R R L V P P G L W G S R H N E R R F L R N T K K F I S L G K H A K L S L Q E L

Fig. 11X



GACGTGGAAGATGAGCGTGCGGGACTGCGCTTGGCTGCGCAGGAGCCCAGGGGTTGGCTGTGTTCCGGCCGAGAGCACCGTCTGCGTGAGGAGATCCTGGCCAAGTTCTGCACTGGCT
T W K M S V R D C A W L R R S P G V G C V P A A E H R L R E E I L A K F L H W L
GATGAGTGTGTACGTGCGAGCTGCTCAGGTCTTTCTTTTATGTCACGGAGACCAGGTTTCAAAGAACAGGCTCTTTTCTACCGGAAGAGTGTCTGGAGCAAGTTGCAAAGCATTGG
M S V Y V V E L L R S F F Y V T E T T F Q K N R L F F Y R K S V W S K L Q S I G
AATCAGACAGCACTTGAAGAGGGTGCAGCTGCGGGAGCTGTCGGAAGCAGAGGTGAGGAGCATCGGGAAGCCAGGCCCGCCCTGCTGACGTCCAGACTCCGCTTCATCCCAAGCCTGA
I R Q H L K R V Q L R E L S E A E V R Q H R E A R P A L L T S R L R F I P K P D

GTGGCTGTGCTTTGGTTAACTTCCTTTTAAACCAGAA
V A V L W F T F L F N Q K

CGGGCTGCGCCGATTGTGAACATGGACTACGTGCGGGAGCCAGAACGTTCCGCAGAGAAAAGAGGGCCGAGCGTCTCACCTGAGGGTGAAGGCACTGTTACGCGTGTCAACTACGA
G L R P I V N M D Y V V G A R T F R R E K R P S V S F R G *

Fig. 11Y



Truncated protein 2 (ver. 2)

ATGCCGCGCGCTCCCCGCTGCCGAGCGTGGCTCCCTGCTGCGCAGCCACTACCGCGAGGTGCTGCCGCTGGCCACGTTCTGTG
M P R A P R C R A V R S L L R S H Y R E V L P L A T F V

CGGCGCCTGGGGCCCCAGGGCTGGCGGCTGGTGCAGCGCGGGGACCCGCGGCTTTCCGCGCGCTGGTGGCCAGTGCCTGGTGTGCGTGCCTGGGACGACAGGCGCCCCCGCGCG
R R L G P Q G W R L V Q R G D P A A F R A L V A Q C L V C V P W D A R P P P A A

GGCCTCCCCGGGTCGGCGTCCGGCTGGGGTTGAGGGCGGGGGGAACAGCGACATGCGGAGAGCAGCGCAGGCGACTCAGGGCGCTTCCCCCGCAGGTG
G L P G V G V R L G L R A A G G N Q R H A E S S A G D S G R F P R R
A S P G S A S G W G * G R P G G T S D M R R A A Q A T Q G A S P A G
P P R G R R P A G V E G G R G E P A T C G E Q R R R L R A L P P Q V

CCCCCTCTTCCGCCAGGTGCTCTGCTGAAGGAGCTGGTGGCCGAGTGTGTCAGAGGCTGTGCGAGCGCGGCGGAAGAACGTGCTGGCCTTCGGCTTCGCGCTGCTGGACGGGGCCCG
P S F R Q V S C L K E L V A R V L Q R L C E R G A K N V L A F G F A L L D G A R

CGGGGGCCCCCGAGGCTTACCACCAGCGTGCAGCTACCTGCCAACACGGTGACCGACGCACTGCGGGGAGCGGGCGTGGGGGCTGCTGCTGCGCGCGTGGGCGACGACGT
G G P P E A F T T S V R S Y L P N T V T D A L R G S G A W G L L L R R V G D D V

GCTGTTACCTGCTGGCAGCTGCGCGCTCTTTGTGCTGGTGGCTCCAGCTGCGCTACCGAGTGTGCGGGCCCGCGTGTACCAGCTCGGCGTGCCTCAGGCGCGGGCCCCCGCC
L V H L L A R C A L F V L V A P S C A Y Q V C G P P L Y Q L G A A T Q A R P P P

ACACGCTAGTGGACCCGAAGCGCTGGGATGCGAACGGGCTGGAACCATAGCGTCAGGAGGCGGGGTCCTCCCTGGGCTGCCAGCCCCGGGTGCGAGGAGGCGGGGGCAGTGC
H A S G P R R R L G C E R A W N H S V R E A G V P L G L P A P G A R R R G G S A

CAGCGAAGTCTGCCGTTGCCAAGAGGCCAGGCGTGGCGCTGCCCCGAGCGGAGCGGACGCCGTTGGGCGAGGGTCTGGGCCCACCCGGGCGAGGACGCTGGACCGAGTGACCG
S R S L P L P K R P R R G A A P E P E R T P V G Q G S W A H P G R T R G P S D R

TGGTTTCTGTGTGTGCTACCTGCCAGACCCGCGAAGAAGCCACCTCTTTGGAGGTTGCGCTCTCTGGCACGCGCCACTCCACCCATCCGTGGGCGCGCAGCACCAGCGGGCCCCC
G F C V V S P A R P A E E A T S L E G A L S G T R H S H P S V G R Q H H A G P P

ATCCACATCGCGCCACCACGTCCTGGGACACGCTTGTCCCCGGGTGACGCCGAGACCAAGCACTTCTCTACTCTCAGGCGACAAGGAGCAGTGGCGCCCTCTTCTACTACG
S T S R P P R P W D T P C P P V Y A E T K H F L Y S S G D K E Q L R P S F L L S

CTCTGAGGCGCCAGCTGACTGGCGCTCGGAGGCTCGTGAGACCATCTTTCTGGTTCCAGGCGCTGGATGCCAGGGACTCCCGCAGGTTGCCCCGCTGCCCGAGCGCTACTGGCA
S L R P S L T G A R R L V E T I F L G S R P W M P G T P R R L P R L P Q R Y W Q

AATCGGGCCCTGTTTCTGAGGCTGCTTGGGAACACGCGAGTGCCCTACGGGGTGTCTCTAAGACGCACTGCCGCTGCGAGCTGCGGTACCCAGCAGCGGTTGTGTGCCG
M R P L F L E L L G N H A Q C P Y G V L L K T H C P L R A A V T P A A G V C A R

GGAGAAGCCCGAGGCTCTGTGGCGCCCCGAGGAGGAGACAGACCCCGTGCCTGGTGCAGTGTCTCGCCAGCAGCAGCCCTGGCAGGTGTACGGCTTCGTGCGGGCTG
E K P Q G S V A A P E E E D T D P R R L V Q L L R Q H S S P W Q V Y G F V R A C

CCTGCGCGGCTGGTGGCCCCAGGCTCTGGGGTCCAGGCACAACGACCGCTTCTCAGGAACACCAAGAAGTTCATCTCCCTGGGGAAGCATGCCAAGCTCTCGTGCAGGAGT
L R R L V P P G L W G S R H N E R R F L R N T K K F I S L G K H A K L S L Q E L

Fig. 11Z



GACGTGGAAGATGAGCGTCCGGGACTGCGCTTGGCTGCGCAGGAGCCAGGGGTTGGCTGTGTCCGGCCGAGAGCACCCTGCGTGAGGAGATCCTGGCCAAGTTCCTGCACTGGCT
T W K M S V R D C A W L R R S P G V G C V P A A E H R L R E E I L A K F L H W L
GATGAGTGTGTACGTGTCGAGCTGCTCAGGTCTTTCTTTATGTACGGAGACCACGTTTCAAAGAACAGGCTCTTTTCTACCGGAAGAGTGTCTGGAGCAAGTTGCAAAGCATTGG
M S V Y V V E L L R S F F Y V T E T T F Q K N R L F F Y R K S V W S K L Q S I G
AATCAGACAGCACTTGAAGAGGGTGAGCTGCGGGAGCTGTGGAAGCAGAGGTGAGGACATCGGGAAGCCAGGCCCGCCCTGCTGACGTCCAGACTCCGCTTCATCCCCAAGCCTGA
I R Q H L K R V Q L R E L S E A E V R Q H R E A R P A L L T S R L R F I P K P D
CGGGCTGCGCCGATTGTGAACATGGACTACGTGCTGGGAGCCAGAAGCTTCCGAGAGAAAAGAGGGCCGAGCGTCTACCTCGAGGGTGAAGGCACTGTTACGGTGTCAACTACGA
G L R P I V N M D Y V V G A R T F R R E K R A E R L T S R V K A L F S V L N Y E
GCGGGCGCGGCCCGGCTCCTGGGCGCTCTGTGCTGGGCTGGACGATATCCAGGGCTGGGCGACCTTCGTGCTGCGTGTGCGGGCCAGGACCCGCGCTGAGCTGTACTT
R A R R P G L L G A S V L G L D D I H R A W R T F V L R V R A Q D P P P E L Y F
TGTAAGGTGGATGTGACGGGCGGTACGACACCATCCCCAGGACAGGCTCAGGAGGTATCGCCAGCATCATCAACCCAGAACACGTACTGCGTGGCTGGGTATGCCGTGGTGA
V K V D V T G A Y D T I P Q D R L T E V I A S I I K P Q N T Y C V R R Y A V V Q
GAAGGCCGCCCATGGGCACGTCCGCAAGGCCTTCAAGAGCCAC
K A A H G H V R K A F K S H

GTCTACGTCCAGTG
V L R P V

CCAGGGGATCCCGCAGGGCTCCATCCTCTCCAGCTGCTCTGCAGCTGTGCTACGGCGACATGGAGAACAAGCTGTTTGGGGGATTGCGGGGACGGGCTGCTCCTGCTTGGTGA
P G D P A G L H P L H A A L O P V L R R H G E Q A V C G D S A G R A A P A F G G
TGATTTCTGTTGGTGACACCTCACCTACCCACGCGAAAACCTTCTCAGGACCTGGTCCGAGGTGTCCTGAGTATGGCTGCGTGGTGAACCTTGGGAAGACAGTGGTGAACCTCC
*

Fig. 11AA



Reference protein (ver. 2)

ATGCCGCGCTCCCCGCTGCCGAGCCGTGCGCTCCCTGCTGCGCAGCCACTACCGCGAG 60
MetProArgAlaProArgCysArgAlaValArgSerLeuLeuArgSerHisTyrArgGlu 20

GTGCTGCCGCTGGCCACGTTCTGTCGGGCGCTGGGGCCCCAGGGCTGGCGGCTGGTGCAG 120
ValLeuProLeuAlaThrPheValArgArgLeuGlyProGlnGlyTrpArgLeuValGln 40

CGCGGGGACCCGGCGGCTTTCCGCGCGCTGGTGGCCAGTGCTGGTGTGCGTGCCCTGG 180
ArgGlyAspProAlaAlaPheArgAlaLeuValAlaGlnCysLeuValCysValProTrp 60

GACGCACGGCCGCCCCCGCCGCCCTCCTTCCGCCAGGTG
AspAlaArgProProProAlaAlaProSerPheArgGlnVal

GGCCTCCCCGGGGTTCGGCTCCGGCTGGGGTTGAGGGCGGCCGGGGGAACCAGCGACATGCGGAG
G L P G V G V R L G L R A A G G N Q R H A E
A S P G S A S G W G * G R P G G T S D M R R
P P R G R R P A G V E G G R G E P A T C G E

AGCAGCGCAGGCGACTCAGGGCGCTTCCCCCGCAGGTG
S S A G D S G R F P R R
A A Q A T Q G A S P A G
Q R R R L R A L P P Q V

TCCTGCCTGAAGGAGCTG 240
SerCysLeuLysGluLeu 80

GTGGCCCGAGTGCTGCAGAGGCTGTGCGAGCGCGCGCAAGAACGTGCTGGCCTTCGGC 300
ValAlaArgValLeuGlnArgLeuCysGluArgGlyAlaLysAsnValLeuAlaPheGly 100

TTCGCGCTGCTGGA[~]GGGGCCCGGGGGCCCCCGAGGCCTTACCACCAGCGTGCGC 360
PheAlaLeuLeuAspGlyAlaArgGlyGlyProProGluAlaPheThrThrSerValArg 120

AGCTACCTGCCAACACGGTGACCGACGCACTGCGGGGGAGCGGGGCGTGGGGGCTGCTG 420
SerTyrLeuProAsnThrValThrAspAlaLeuArgGlySerGlyAlaTrpGlyLeuLeu 140

TTGCGCCGCTGGGCGACGACGTGCTGGTTCACCTGCTGGCACGCTGCGCGCTCTTTGTG 480
LeuArgArgValGlyAspAspValLeuValHisLeuLeuAlaArgCysAlaLeuPheVal 160

CTGGTGGCTCCCAGCTGCGCCTACCAGGTGTGCGGGCCGCGCTGTACCAGCTCGGCGCT 540
LeuValAlaProSerCysAlaTyrGlnValCysGlyProProLeuTyrGlnLeuGlyAla 180

GCCACTCAGGCCCCGCCCCGCCACACGCTAGTGGACCCCGAAGGCGTCTGGGATGCGAA 600
AlaThrGlnAlaArgProProProHisAlaSerGlyProArgArgArgLeuGlyCysGlu 200

Fig. 11AB



CGGACCTGGAACCATAGCGTCAGGGAGGCCGGGGTCCCCCTGGGCCTGCCAGCCCCGGGT	660
ArgAlaTrpAsnHisSerValArgGluAlaGlyValProLeuGlyLeuProAlaProGly	220
GCGAGGAGGCGCGGGGGCAGTGCCAGCCGAAGTCTGCCGTTGCCAAGAGGCCAGGCGT	720
AlaArgArgArgGlyGlySerAlaSerArgSerLeuProLeuProLysArgProArgArg	240
GGCGCTGCCCCTGAGCCGGAGCGGACGCCCCTTGGGCAGGGGTCTGGGCCCACCCGGGC	780
GlyAlaAlaProGluProGluArgThrProValGlyGlnGlySerTrpAlaHisProGly	260
AGGACGCGTGGACCGAGTGACCGTGGTTTCTGTGTGGTGTACCTGCCAGACCCGCCGAA	840
ArgThrArgGlyProSerAspArgGlyPheCysValValSerProAlaArgProAlaGlu	280
GAAGCCACCTCTTTGGAGGGTGCCTCTCTGGCACGCGCCACTCCCACCCATCCGTGGGC	900
GluAlaThrSerLeuGluGlyAlaLeuSerGlyThrArgHisSerHisProSerValGly	300
CGCCAGCACACGCGGGCCCCCATCCACATCGCGGCCACCACGTCCCTGGGACACGCCT	960
ArgGlnHisHisAlaGlyProProSerThrSerArgProProArgProTrpAspThrPro	320
TGTCCCCCGGTGTACGCCGAGACCAAGCACTTCCTCTACTCCTCAGGCGACAAGGAGCAG	1020
CysProProValTyrAlaGluThrLysHisPheLeuTyrSerSerGlyAspLysGluGln	340
CTGCGGCCCTCCTTCTACTCAGCTCTCTGAGGCCAGCCTGACTGGCGCTCGGAGGCTC	1080
LeuArgProSerPheLeuLeuSerSerLeuArgProSerLeuThrGlyAlaArgArgLeu	360
GTGGAGACCATCTTTCTGGGTTCCAGGCCCTGGATGCCAGGGACTCCCCGAGGTTGCCC	1140
ValGluThrIlePheLeuGlySerArgProTrpMetProGlyThrProArgArgLeuPro	380
CGCCTGCCCCAGCGCTACTGGCAAATGCGGCCCTGTTTCTGGAGCTGCTTGGGAACCAC	1200
ArgLeuProGlnArgTyrTrpGlnMetArgProLeuPheLeuGluLeuLeuGlyAsnHis	400
GCGCAGTGCCCCTACGGGGTGCTCCTCAAGACGCACTGCCCCTGCGAGCTGCGGTCACC	1260
AlaGlnCysProTyrGlyValLeuLeuLysThrHisCysProLeuArgAlaAlaValThr	420
CCAGCAGCCGGTGTCTGTGCCCCGGGAGAAGCCCCAGGGCTCTGTGGCGGCCCCGAGGAG	1320
ProAlaAlaGlyValCysAlaArgGluLysProGlnGlySerValAlaAlaProGluGlu	440
GAGGACACAGACCCCGTCGCCTGGTGCAGCTGCTCCGCCAGCACAGCAGCCCTGGCAG	1380
GluAspThrAspProArgArgLeuValGlnLeuLeuArgGlnHisSerSerProTrpGln	460
GTGTACGGCTTCGTGCGGGCCTGCCTGCGCCGGCTGGTGCCCCAGGCCTCTGGGGCTCC	1440
ValTyrGlyPheValArgAlaCysLeuArgArgLeuValProProGlyLeuTrpGlySer	480
AGGCACAACGAACGCCGCTTCCTCAGGAACACCAAGAAGTTCATCTCCCTGGGGAAGCAT	1500
ArgHisAsnGluArgArgPheLeuArgAsnThrLysLysPheIleSerLeuGlyLysHis	500
GCCAAGCTCTCGCTGCAGGAGCTGACGTGGAAGATGAGCGTGCGGGGCTGCGCTTGCTG	1560
AlaLysLeuSerLeuGlnGluLeuThrTrpLysMetSerValArgAspCysAlaTrpLeu	520

Fig. 11AC



CGCAGGAGCCCAGGGGTTGGCTGTGTTCCGGCCGAGAGCACCGTCTGCGTGAGGAGATC	1620
ArgArgSerProGlyValGlyCysValProAlaAlaGluHisArgLeuArgGluGluIle	540
CTGGCCAAGTTCCTGCACTGGCTGATGAGTGTGTACGTCGAGCTGCTCAGGTCTTTC	1680
LeuAlaLysPheLeuHisTrpLeuMetSerValTyrValValGluLeuLeuArgSerPhe	560
TTTTATGTCACGGAGACCAGTTTCAAAAGAACAGGCTCTTTTTCTACCGGAAGAGTGTC	1740
PheTyrValThrGluThrThrPheGlnLysAsnArgLeuPhePheTyrArgLysSerVal	580
TGGAGCAAGTTGCAAAGCATTGGAATCAGACAGCACTTGAAGAGGGTGACGCTGCGGGAG	1800
TrpSerLysLeuGlnSerIleGlyIleArgGlnHisLeuLysArgValGlnLeuArgGlu	600
CTGTGGAAGCAGAGGTCAGGCAGCATCGGGAAGCCAGGCCCGCCCTGCTGACGTCCAGA	1860
LeuSerGluAlaGluValArgGlnHisArgGluAlaArgProAlaLeuLeuThrSerArg	620
CTCCGCTTCATCCCCAAGCCTGACGGGCTGCGGCCGATTGTGAACATGGACTACGTCGTG	1920
LeuArgPheIleProLysProAspGlyLeuArgProIleValAsnMetAspTyrValVal	640
GGAGCCAGAACGTTCCGCAGAGAAAAGAGGGCCGAGCGTCTCACCTCGAGGGTGAAGGCA	1980
GlyAlaArgThrPheArgArgGluLysArgAlaGluArgLeuThrSerArgValLysAla	660
CTGTTACAGCTGCTCAACTACGAGCGGGCGCGGCCCGCCCTCCTGGGCGCCTCTGTG	2040
LeuPheSerValLeuAsnTyrGluArgAlaArgArgProGlyLeuLeuGlyAlaSerVal	680
CTGGGCCTGGACGATATCCACAGGGCCTGGCGCACCTTCGTGCTGCGTGTGCGGGCCCAG	2100
LeuGlyLeuAspAspIleHisArgAlaTrpArgThrPheValLeuArgValArgAlaGln	700
GACCCGCCGCTGAGCTGTACTTTGTCAAGGTGGATGTGACGGGCGCGTACGACACCATC	2160
AspProProProGluLeuTyrPheValLysValAspValThrGlyAlaTyrAspThrIle	720
CCCCAGGACAGGCTCACGGAGGTCATCGCCAGCATCATCAAACCCAGAACACGTACTGC	2220
ProGlnAspArgLeuThrGluValIleAlaSerIleIleLysProGlnAsnThrTyrCys	740
GTGCGTCGGTATGCCGTGGTCCAGAAGGCCGCCCATGGGCACGTCCGCAAGGCCTTCAAG	2280
ValArgArgTyrAlaValValGlnLysAlaAlaHisGlyHisValArgLysAlaPheLys	760
AGCCACGTCTCTACCTTGACAGACCTCCAGCCGTACATGCGACAGTTCGTGGCTCACCTG	2340
SerHisValSerThrLeuThrAspLeuGlnProTyrMetArgGlnPheValAlaHisLeu	780
CAGGAGACCAGCCCGCTGAGGGATGCCGTCGTCATCGAGCAGAGCTCCTCCCTGAATGAG	2400
GlnGluThrSerProLeuArgAspAlaValValIleGluGlnSerSerSerLeuAsnGlu	800
GCCAGCAGTGGCCTCTTCGACGTCTTCTACGCTTCATGTGCCACCACGCCGTGCGCATC	2460
AlaSerSerGlyLeuPheAspValPheLeuArgPheMetCysHisHisAlaValArgIle	820
AGGGGCAAGTCTACGTCCAGTGCCAGGGGATCCCGCAGGGCTCCATCCTCTCCACGCTG	2520
ArgGlyLysSerTyrValGlnCysGlnGlyIleProGlnGlySerIleLeuSerThrLeu	840

Fig. 11AD



CTCTGCAGCCTGTGCTACGGCGACATGGAGAACAAGCTGTTTGCGGGGATTGCGCGGGAC	2580
LeuCysSerLeuCysTyrGlyAspMetGluAsnLysLeuPheAlaGlyIleArgArgAsp	860
GGGCTGCTCCTGCGTTTGGTGGATGATTTCTTGTGGTGACACCTCACCTCACCCACGCG	2640
GlyLeuLeuLeuArgLeuValAspAspPheLeuLeuValThrProHisLeuThrHisAla	880
AAAACCTTCCTCAGGACCCTGGTCCGAGGTGTCCCTGAGTATGGCTGCGTGGTGAACCTG	2700
LysThrPheLeuArgThrLeuValArgGlyValProGluTyrGlyCysValValAsnLeu	900
CGGAAGACAGTGGTGAACCTCCCTGTAGAAGACGAGGCCCTGGGTGGCACGGCTTTTGT	2760
ArgLysThrValValAsnPheProValGluAspGluAlaLeuGlyGlyThrAlaPheVal	920
CAGATGCCGGCCACGGCCTATTCCCCTGGTGCGGCCTGCTGCTGGATACCCGGACCCTG	2820
GlnMetProAlaHisGlyLeuPheProTrpCysGlyLeuLeuLeuAspThrArgThrLeu	940
GAGGTGCAGAGCGACTACTCCAGCTATGCCCGGACCTCCATCAGAGCCAGTCTCACCTTC	2880
GluValGlnSerAspTyrSerSerTyrAlaArgThrSerIleArgAlaSerLeuThrPhe	960
AACCGCGGCTTCAAGGCTGGGAGGAACATGCGTCGAAACTCTTTGGGGTCTTGCGGCTG	2940
AsnArgGlyPheLysAlaGlyArgAsnMetArgArgLysLeuPheGlyValLeuArgLeu	980
AAGTGTACAGCCTGTTTCTGGATTTGCAGGTGAACAGCCTCCAGACGGTGTGCACCAAC	3000
LysCysHisSerLeuPheLeuAspLeuGlnValAsnSerLeuGlnThrValCysThrAsn	1000
ATCTACAAGATCCTCCTGCTGCAGGCGTACAGGTTTCACGCATGTGTGCTGCAGCTCCCA	3060
IleTyrLysIleLeuLeuLeuGlnAlaTyrArgPheHisAlaCysValLeuGlnLeuPro	1020
TTTCATCAGCAAGTTTGAAGAACCCACATTTTTCTGCGCGTCATCTCTGACACGGCC	3120
PheHisGlnGlnValTrpLysAsnProThrPhePheLeuArgValIleSerAspThrAla	1040
TCCCTCTGCTACTCCATCCTGAAAGCCAAGAACGCAGGGATGTCGCTGGGGGCCAAGGGC	3180
SerLeuCysTyrSerIleLeuLysAlaLysAsnAlaGlyMetSerLeuGlyAlaLysGly	1060
GCCGCCGGCCCTCTGCCCTCCGAGGCCGTGCAGTGGCTGTGCCACCAAGCATTCTGCTC	3240
AlaAlaGlyProLeuProSerGluAlaValGlnTrpLeuCysHisGlnAlaPheLeuLeu	1080
AAGCTGACTCGACACCGTGTACCTACGTGCCACTCCTGGGGTCACTCAGGACAGCCCAG	3300
LysLeuThrArgHisArgValThrTyrValProLeuLeuGlySerLeuArgThrAlaGln	1100
ACGCAGCTGAGTCGGAAGCTCCCGGGGACGACGCTGACTGCCCTGGAGGCCGAGCCAAC	3360
ThrGlnLeuSerArgLysLeuProGlyThrThrLeuThrAlaLeuGluAlaAlaAlaAsn	1120
CCGGCACTGCCCTCAGACTTCAAGACCATCCTGGAC	3420
ProAlaLeuProSerAspPheLysThrIleLeuAsp	1132

Fig. 11AE



Truncated protein 3 (ver. 2)

ATGCCGCGCGCTCCCGCTGCCGAGCGGTGCGCTCCCTGCTGCCGAGCCACTACCGGAGGTGCTGCCGTGGCCACGTTCTGTG
M P R A P R C R A V R S L L R S H Y R E V L P L A T F V

CGGCGCTGGGGCCCCAGGGCTGGCGGTGGTGCAGCGCGGGGACCGCGGCTTTCCGCGCGCTGGTGGCCAGTGCTGGTGTGCGTGCCCTGGGACGACGGCCGCCCCCGCCG
R R L G P Q G W R L V Q R G D P A A F R A L V A Q C L V C V P W D A R P P P A A

GGCTCCCGGGGTGCGGTCCGGCTGGGGTTGAGGGCGGGCGGGGGAACAGCGACATGCGGAGAGCAGCGAGGCGACTCAGGGCGCTTCCCCCGAGGTG
G L P G V G V R L G L R A A G G N Q R H A E S S A G D S G R F P R R
A S P G S A S G W G * G R P G G T S D M R R A A Q A T Q G A S P A G
P P R G R R P A G V E G G R G E P A T C G E Q R R R L R A L P P Q V

CCCCCTTCCGCGAGGTGCTGCTGAAGGAGCTGGTGGCCGAGTGTGCAGAGGCTGTGCCGAGCGGGCGGAAGAAGTGTGGCTTCGGCTTCGCGCTGCTGGACGGGGCCG
P S F R Q V S C L K E L V A R V L Q R L C E R G A K N V L A F G F A L L D G A R

CGGGGGCCCCCGAGGCTTACCACAGCGTGGCGAGTACCTGCCAACACGGTGACCGAGCACTGCCGGGGAGCGGGGCTGGGGGCTGCTGCTGCCCGCGTGGGCGACGAGT
G G P P E A F T T S V R S Y L P N T V T D A L R G S G A W G L L L R R V G D D V

GCTGGTTACCTGCTGGCAGCTGCGCGCTTTTGTGCTGGTGGCTCCAGCTGCGCTACCAGGTGTGCGGGCGCCGCTGTACCAGCTCGGCGTGCCTAGGCCCGGCCCCCGCC
L V H L L A R C A L F V L V A P S C A Y Q V C G P P L Y Q L G A A T Q A R P P P

ACACGCTAGTGAGCCCGAAGGCGTCTGGGATGCGAAGGGCTGGAACATAGCGTCAGGGAGGCGGGGTCCCCCTGGGCTGCCAGCCCCGGTGGAGAGGCGGGGGCAGTGC
H A S G P R R R L G C E R A W N H S V R E A G V P L G L P A P G A R R R G G S A

CAGCGAAGTCTGCCGTTGCCAAGAGGGCCAGGCGTGGCGCTGCCCTGAGCGGAGCGGACGCCGTTGGGCAAGGGTCTGGGCCACCCGGGAGGAGCGTGGACCGAGTGACCG
S R S L P L P K R P R R G A A P E P E R T P V G Q G S W A H P G R T R G P S D R

TGGTTCTGTGTGTGTCACCTGCCAGACCCGCCAAGAAGCCACCTTTTGGAGGCTGCGCTCTCTGGCAGCGCCACTCCACCCATCCGTGGGCGCCAGCACCAGCGGGCCCCC
G F C V V S P A R P A E E A T S L E G A L S G T R H S H P S V G R Q H H A G P P

ATCCACATCGCGGCCACACGTCCTGGGACAGCCTTGTCCCCGGTGTACGCGGAGACCAAGCACTTCTCTACTCTCAGGCGACAAGGAGCAGTGGCGCCCTCTCTACTCAG
S T S R P P R P W D T P C P P V Y A E T K H F L Y S S G D K E Q L R P S F L L S

CTCTGAGGCCAGCCTGACTGGCGCTCGGAGGCTCGTGGAGACCATTTTCTGGGTTCCAGGCCCTGGATGCCAGGGAATCCCGCAGGTGCCCCGCTGCCCCAGCGCTACTGGCA
S L R P S L T G A R R L V E T I F L G S R P W M P G T P R R L P R L P Q R Y W Q

AATGCGGCCCTGTTTCTGGAGCTGCTTGGGAACCGCGCAGTGCCCTACGGGGTGTCTCAAGACGCACTGCCCGCTGCGAGCTGCGGTACCCGAGCAGCGGGTGTGTGCCCCG
M R P L F L E L L G N H A Q C P Y G V L L K T H C P L R A A V T P A A G V C A R

GGAGAAGCCCCAGGGCTCTGTGGCGGCCCCGAGGAGGAGACAGACCCCGTGGCTGGTGCAGCTGCTCCGCCAGCAGCAGCCCTGGCAGGTGTACGGCTTCGTGCGGGCTG
E K P Q G S V A A P E E E D T D P R R L V Q L L R Q H S S P W Q V Y G F V R A C

CCTGCGCGGCTGGTGGCCCCAGGCTCTGGGGCTCCAGGCACAACGAGCCGCTTCTCAGGAACCAAGAAGTTATCTCCCTGGGAAGCATGCCAAGCTCTGCTGCAGGAGT
L R R L V P P G L W G S R H N E R R F L R N T K K F I S L G K H A K L S L Q E L

Fig. 11AF



GACGTGGAAGATGAGCGTGGGGACTGCGCTTGGCTGCGCAGGAGCCAGGGGTTGGCTGTGTTCCGGCCGAGAGCACCGTCTGCGTGAGGAGATCCTGGCCAAGTTCCTGCACTGGCT
T W K M S V R D C A W L R R S P G V G C V P A A E H R L R E E I L A K F L H W L

GATGAGTGTGTACGTCGTCGAGCTGCTCAGGTCTTTCTTTTATGTACGGAGACCAGCTTTCAAAGAAGAGGCTCTTTTCTACCGGAAGAGTGTCTGGAGCAAGTTGCAAAGCATGG
M S V Y V V E L L R S F F Y V T E T T F Q K N R L F F Y R K S V W S K L Q S I G

AATCAGACAGCACTTGAAGAGGGTGACGTGCGGGAGCTGTGGAAGCAGAGGTGAGGAGCATCGGGAAGCCAGGCCGCCCTGCTGACGTCCAGACTCCGCTTCATCCCAAGCCTGA
I R Q H L K R V Q L R E L S E A E V R Q H R E A R P A L L T S R L R F I P K P D

CGGGCTGCGGCCGATTGTGAACATGGACTACGTGCTGGGAGCCAGAAGCTTCCGAGAGAAAGAGGGCCGAGCGTCTACCTCGAGGGTGAAGGCACTGTTGAGCGTCTCAACTACGA
G L R P I V N M D Y V V G A R T F R R E K R A E R L T S R V K A L F S V L N Y E

CGGGCGCGCGCCCGGCTCTCTGGGCGCTGTGCTGGGCTGGAGCATATCCAGGGCTGGCGACCTTCTGCTGCTGCGTGTGGGGCCAGGACCGCCGCTGAGCTGTACTT
R A R R P G L L G A S V L G L D D I H R A W R T F V L R V R A Q D P P P E L Y F

TGTAAGGTGGATGTGACGGGCGGTACGACACCATCCCCAGGACAGGCTCAGGAGGTATCGGCAGCATCATCAACCCAGAACACGTACTGCGTGGCTGGTATGCCGTGGTCCA
V K V D V T G A Y D T I P Q D R L T E V I A S I I K P Q N T Y C V R R Y A V V Q

GAAGGCCGCCATGGGCAGTCCGCAAGGCCTTCAAGAGCCAGCTCTACCTTGACAGACTCCAGCGGTACATGCGACAGTTGCTGGCTCACCTGCAGGAGACCAGCCGCTGAGGGA
K A A H G H V R K A F K S H V S T L T D L Q P Y M R Q F V A H L Q E T S P L R D

TGCCGTCGTCATGAGCAGAGCTCCTCCGTAATGAGGCCAGCAGTGGCTCTTCGACGTCTTCTACGCTTCTGTCACCACGCGGTGCGCATCAGGGCAAGTCTACGTCCAGTG
A V V I E Q S S S L N E A S S G L F D V F L R F M C H H A V R I R G K S Y V Q C

CCAGGGGATCCCGAGGGCTCCATCTCTCCAGCTGCTCTGCAGCCTGTGCTACGGGACATGGAGAACAAGCTGTTTGGGGGATTGCGGGGACGGGCTGCTCTCGCTTGGTGA
Q G I P Q G S I L S T L L C S L C Y G D M E N K L F A G I R R D G L L L R L V D

TGATTTCTGTTGGTGACACCTCACCTCACCCACGCCAAAACCTTCTCAGGACCTGGTCCGAGGTGTCCCTGAGTATGGCTGCGTGGTGAACCTGCGGAAGACAGTGGTGAACCTCCC
D F L L V T P H L T H A K T F L R T L V R G V P E Y G C V V N L R K T V V N F P

TGTAGAAGACGAGGCCCTGGGTGGCAGGGCTTTTGTTCAGATGCCGGCCACGGCTATTCCCTGGTGGGCTGCTGCTGGATACCGGACCTGGAGGTGCAGAGCGACTACTCCAG
V E D E A L G G T A F V Q M P A H G L F P W C G L L L D T R T L E V Q S D Y S R

GTGAGCGCACCTGGCCGGAAGTGAGCCTGTGCCGGCTGGGGCAGGTGCTGCTGACGGGCCGTGGCTCCACCTCTGCTTCCGTGTGGGGCAGGCGACTGCCAATCCCAAGGGTCAGA
*

TGCCACAGGGTGCCCTCGTCCCATCTGGGGCTGAGCACAATGCATCTTTCTGTGGGAGTGAGGGTGCCCTCACACGGGAGCAGTTTTCTGTGCTATTTTGGTAA...

Fig. 11AG



Altered C-terminus protein (ver. 2)

ATGCCGCGCGCTCCCGCTGCCAGCCGCTGCGCTCCCTGCTGCCAGCCACTACCGCGAGGTGCTGCCGTGCCACGTTCTG
M P R A P R C R A V R S L L R S H Y R E V L P L A T F V

CGGCGCTGGGGCCCCAGGGCTGGCGGCTGGTGACGCGGGGACCCGGCGCTTTCCGCGCGCTGGTGCCAGTGCCTGGTGCGTGCCCTGGGACGACGGCGCCCCCGCGCG
R R L G P Q G W R L V Q R G D P A A F R A L V A Q C L V C V P W D A R P P P A A

GGCCTCCCCGGGGTGGCGCTCCGGCTGGGGTTGAGGGCGGGGGGAACAGCGACATGCGGAGAGCAGCGCAGGCGACTCAGGGCGCTTCCCCCGCAGGTG
G L P G V G V R L G L R A A G G N Q R H A E S S A G D S G R F P R R
A S P G S A S G W G * G R P G G T S D M R R A A Q A T Q G A S P A G
P P R G R R P A G V E G G R G E P A T C G E Q R R R L R A L P P Q V

CCCTCCTTCCGCCAGGTGCTCCTGCTGAAGGAGCTGGTGGCCGAGTGTGACAGGCTGTGCGAGCGGGCGGAAGAAGTGTGGCTTCGGCTTCGCGCTGCTGGACGGGGCCCG
P S F R Q V S C L K E L V A R V L Q R L C E R G A K N V L A F G F A L L D G A R

CGGGGGCCCCCGAGGCTTACCACAGCGTGGCGAGCTACCTGCCAACACGGTGACCGAGCACTGCGGGGAGCGGGGCTGGGGGCTGCTGCTGCCCGCGTGGGCGACGAGCT
G G P P E A F T T S V R S Y L P N T V T D A L R G S G A W G L L L R R V G D D V

GCTGGTTCACCTGCTGGCAGCTGCGCGCTTTGTGCTGGTGGCTCCAGCTGCGCTACCAGGTGTGCGGGCGCGCGTGTACCAGTTCGGCGCTGCCACTCAGGCCGGGGCCCCCGC
L V H L L A R C A L F V L V A P S C A Y Q V C G P P L Y Q L G A A T Q A R P P P

ACACGCTAGTGGACCCCGAAGGCGTCTGGGATGCGAACGGGCTGGAACCATAGCGTCAGGGAGGCGGGGTCCCCCTGGGCTGCCAGCCCCGGGTGCCGAGGAGCGCGGGGCGAGTGC
H A S G P R R R L G C E R A W N H S V R E A G V P L G L P A P G A R R R G G S A

CAGCGAAGTCTGCCGTTGCCAAGAGGCGGAGGCGTGGCGCTGCCCTGAGCCGAGCGGACGCCGTTGGGCGAGGGTCTGGGCGCACCGGGGAGCGGTGGACCGAGTGACCG
S R S L P L P K R P R R G A A P E P E R T P V G Q G S W A H P G R T R G P S D R

TGGTTCTGTGTGGTGTACCTGCCAGACCCCGGAAGGCCACCTCTTTGGAGGGTGGCTCTGTGGCACGGCCACTCCACCCATCCGTGGGCGCGCAGCACCAGCGGGGGCCCCC
G F C V V S P A R P A E E A T S L E G A L S G T R H S H P S V G R Q H H A G P P

ATCCACATCGCGGCCACACGTCCTGGGACAGCCTTGTCCCCGGGTACGCGGAGACCAAGCACTTCTCTACTCTCAGGCGACAAGGAGAGCTGCGGGCCTCTCTACTACTAG
S T S R P P R P W D T P C P P V Y A E T K H F L Y S S G D K E Q L R P S F L L S

CTCTGAGGCGCCAGCTGACTGGCGCTCGGAGGCTCGTGAGACCATCTTTCTGGTTCCAGGCGCTGGATGCCAGGGAATCCCGCAGGTTGCCCGCCTGCCAGCGCTACTGGCA
S L R P S L T G A R R L V E T I F L G S R P W M P G T P R R L P R L P Q R Y W Q

AATCGGGCCCTGTTCTGGAGCTGCTTGGGAACACGCGCAGTGCCCTACGGGGTGTCTCTCAAGACGCACTGCCCGTGGAGCTGCGGTACCCGAGCAGCGGCTGTCTGTCGGC
M R P L F L E L L G N H A Q C P Y G V L L K T H C P L R A A V T P A A G V C A R

GGAGAAGCCCCAGGGCTCTGTGGCGGGCCCCGAGGAGGAGACAGACCCCGTGGCTGGTGACGTGCTCCGCCAGCACAGCGCCCTGGCAGGTGTACGGCTCTGTGGGGCTG
E K P Q G S V A A P E E E D T D P R R L V Q L L R Q H S S P W Q V Y G F V R A C

CCTGCGCGGGTGGTGGCGGCGCTCTGGGCTCCAGGCACAACGAACGCCGCTTCTCAGGAACACCAAGAAGTTCTCTCTGGGAAGCATGCCAAGCTCTCGCTGACGAGGT
L R R L V P P G L W G S R H N E R R F L R N T K K F I S L G K H A K L S L Q E L

Fig. 11AH



GACGTGGAAGATGAGCGTGGGGACTGCGCTTGGCTGCGCAGGAGCCAGGGGTGGCTGTGTTCCGGCCGAGAGCACCCTGCGTGAGGAGATCCTGGCCAAGTTCCTGCACTGGCT
T W K M S V R D C A W L R R S P G V G C V P A A E H R L R E E I L A K F L H W L

GATGAGTGTGACGTGCTGAGCTGCTCAGGTCTTTCTTTATGTACGGAGACCACGTTTCAAAGAACAGGCTCTTTTCTACCGGAAGAGTGTCTGGAGCAAGTTGCAAAGCATTGG
M S V Y V V E L L R S F F Y V T E T T F Q K N R L F F Y R K S V W S K L Q S I G

AATCAGACAGCACTTGAAGAGGGTGACGTGCGGGAGCTGTGGAAGCAGAGGTACGGCAGCATCGGAAGCCAGGCCCGCTGCTGACGTCCAGACTCCGCTTCATCCCCAAGCCTGA
I R Q H L K R V Q L R E L S E A E V R Q H R E A R P A L L T S R L R F I P K P D

CGGGCTGCGCCGATTGTGAACATGGACTACGTGCTGGGAGCCAGAACGTTCCGACAGAAAAGAGGGCCGAGCGTCTACCTCGAGGGTGAAGGCACTGTTGAGCGTCTCACTACGA
G L R P I V N M D Y V V G A R T F R R E K R A E R L T S R V K A L F S V L N Y E

GCGGGCGCGGCCCGCGCTCTGGGCGCTCTGTGCTGGGCGCTGGAGCATATCCAGGGCTGGCGACCTTCGTGCTGCGTGTGGGGCCAGGACCGCGCGCTGAGCTGTA
R A R R P G L L G A S V L G L D D I H R A W R T F V L R V R A Q D P P P E L Y F

TGTCAAGGTGGATGTGACGGGCGGTACGACACCATCCCCAGGACAGGCTACGGAGGTACATCGGCAGCATCATCAAAACCCAGAACACGTACTGCGTGGTGGTATGCCGTGGTCCA
V K V D V T G A Y D T I P Q D R L T E V I A S I I K P Q N T Y C V R R Y A V V Q

GAAGGCGGCCCATGGGACGTCCGCAAGGCTTCAAGAGCCACGTCTCTACCTTGACAGACCTCCAGCGTACATGCGACAGTTCGTGGCTCACCTGCAGGAGACCAGCCGCTGAGGGA
K A A H G H V R K A F K S H V S T L T D L Q P Y M R Q F V A H L Q E T S P L R D

TGCCGTGCTCATGAGCAGAGCTCCTCCCTGAATGAGGCCAGCAGTGGCTCTTGACGTCTTCTACGCTTCATGTGCCACCACGCCGTGCGCATCAGGGGCAAGTCTACGTCCAGTG
A V V I E Q S S S L N E A S S G L F D V F L R F M C H H A V R I R G K S Y V Q C

CCAGGGGATCCCGAGGGCTCCATCCTCTCCACGCTGCTCTGCAGCCTGTGTACGGGACATGGAGAACAAGCTGTTTGGGGGATTGCGGGGACGGGCTGCTCCTGCTTTGGTGA
Q G I P Q G S I L S T L L C S L C Y G D M E N K L F A G I R R D G L L L R L V D

TGATTTCTGTTGGTGACACCTCACCTCACCCAGCGAAAACCTTCTCAGGACCCTGGTCCGAGGTGCTCCTGAGTATGGCTGCGTGGTGAACCTTGGGAAGACAGTGGTGAACCTCCC
D F L L V T P H L T H A K T F L R T L V R G V P E Y G C V V N L R K T V V N F P

TGTAGAAGACAGGGCCCTGGGTGGCAGGCTTTTGTTCAGATGCCGGGCCACGGCCTATTCCCTGGTGGCGCTGCTGCTGGATACCCGGACCTGGAGGTGCAGAGCGACTACTCCAG
V E D E A L G G T A F V Q M P A H G L F P W C G L L L D T R T L E V Q S D Y S S

CTATGCCCGGACCTCCATCAGAGCAGTCTCACCTTCAACCGGGCTTCAAGGTGGGAGGAACATGCGTGCAGAACTCTTTGGGGTCTTGGGGTGAAGTGTACAGCCTGTTTCTGGA
Y A R T S I R A S L T F N R G F K A G R N M R R K L F G V L R L K C H S L F L D

TTTGAGGTGAACAGCCTCCAGACGGTGTGCACCAACATCTACAAGATCCTCTGCTGCAGGCGTACAGGTTTACGCATGTGTGCTGCAGTCCCATTTCATCAGCAAGTTTGAAGAA
L Q V N S L Q T V C T N I Y K I L L L Q A Y R F H A C V L Q L P F H Q Q V W K N

CCCCACATTTTCTGCGGTCATCTCTGACACGGCTCCTCTGCTACTCCATCCTGAAAGCCAAGAAGCAGGAGTGTGCTGGGGCCAAGGGCGCCGCGGCTCTGCCCTCCGA
P T F F L R V I S D T A S L C Y S I L K A K N A E

CCGAAGAAAACATTTCTGCTGACTCCTGCGGTGCTGGGTC
E E N I L V V T P A V L G S

GGGACAGCCAGAGATGGAGCCACCCGACACCGTGGGTGTGGGAGCTTTCCGGTGTCTCTGGGAGGGAGTTGGGCTGGGCTGTGACTCCTCAGCCTCTGTTTTCCCCAG
G Q P E M E P P R R P S G V G S F P V S P G R G V G L G L *

Fig. 11AI



Protein that lacks motif A (ver. 2)

ATGCCGCGCGCTCCCGCTGCCGAGCGGTGCGCTCCCTGCTGCGCAGCCACTACCGCAGGTGCTGCCGCTGGCCACGTTGCTG
M P R A P R C R A V R S L L R S H Y R E V L P L A T F V

CGGCGCTGGGGCCCCAGGGCTGGCGGCTGGTGCAGCGCGGGGACCCGGCGGCTTCCGCGCGCTGGTGGCCAGTGCCCTGGTGTGCGTGGCCCTGGGACGCACGGCCGCCCCCGCGC
R R L G P Q G W R L V Q R G D P A A F R A L V A Q C L V C V P W D A R P P P A A

GGCCTCCCCGGGGTCCGCGTCCGCGTGGGGTTGAGGGCGGCGGGGGGAACAGCGACATGCGGAGAGCAGCGCAGGCGACTCAGGGCGCTTCCCCCGCAGGTG
G L P G V G V R L G L R A A G G N Q R H A E S S A G D S G R F P R R
A S P G S A S G W G * G R P G G T S D M R R A A Q A T Q G A S P A G
P P R G R R P A G V E G G R G E P A T C G E Q R R R L R A L P P Q V

CCCCCTCTCCGCCAGGTGCTGCTGAAGGAGCTGGTGGCCGAGTGCTGCAGAGCTGTGCGAGCGCGGCGGAAGAACGTGCTGGCTTCGGCTTCGCGCTGCTGGACGGGGCCG
P S F R Q V S C L K E L V A R V L Q R L C E R G A K N V L A F G F A L L D G A R

CGGGGGCCCCCGAGGCTTACCACAGCGTGGCAGCTACCTGCCCAACACGCTGACCGACGCACTGCGGGGAGCGGGGCGTGGGGGCTGCTGCTGCGCCGCGTGGGCGACGCT
G G P P E A F T T S V R S Y L P N T V T D A L R G S G A W G L L L R R V G D D V

GCTGGTTACCTGCTGGCAGCTGCGCGCTTTTGCTGGTGGCTCCAGCTGCGCTACAGGTGTGCGGGCCGCGCTGTACCAGCTCGGCGCTGCCACTCAGGCCCGGGCCCCCGC
L V H L L A R C A L F V L V A P S C A Y Q V C G P P L Y Q L G A A T Q A R P P P

ACACGCTAGTGACCCGAAGGCGTCTGGGATGCGAAGCGGCTGGAACATAGCGTCAGGGAGGCGGGGTCCCCCTGGGCTGCCAGCCCCGGGTGCGAGGAGCGCGGGGCGAGTGC
H A S G P R R R L G C E R A W N H S V R E A G V P L G L P A P G A R R R G G S A

CAGCCGAAGTCTGCCGTTGCCAAGAGGCCAGGCGTGGCGCTGCCCTGAGCCGGAGCGGACGCCGCTGGGCGAGGGGCTCTGGGCCACCCGGGAGGACGCGTGGACGAGTGACCG
S R S L P L P K R P R R G A A P E P E R T P V G Q G S W A H P G R T R G P S D R

TGGTTTCTGTGGTGTACCTGCCAGACCCGCGGAAGAAGCCACCTCTTTGAGGGGTGCGCTCTCTGGCACGGCCACTCCACCCATCCGTGGGCGCCAGCACACGCGGGCCCCC
G F C V V S P A R P A E E A T S L E G A L S G T R H S H P S V G R Q H H A G P P

ATCCACATCGCGGCCACCAGTCCCTGGGACAGCCTTGTCGCCCGGTGTACGCCGAGACCAAGCACTTCTCTACTCTCAGGCGACAAGGAGCAGCTGCGGCCCTCTCTCTACTCAG
S T S R P P R P W D T P C P P V Y A E T K H F L Y S S G D K E Q L R P S F L L S

CTCTGAGGCCAGCCTGACTGGCGCTCGGAGGCTCGTGGAGACCATCTTTCTGGGTTCAGGCCCTGGATGCCAGGGACTCCCGCAGGTTGCCCCGCTGCCCCAGCGCTACTGGCA
S L R P S L T G A R R L V E T I F L G S R P W M P G T P R R L P R L P Q R Y W Q

AATCGGGCCCTGTTTCTGAGCTGCTTGGGAACACGCGCAGTGCCCTACGGGGTGTCTCTCAAGACGCACTGCCGCTGCGAGCTGCGGTACCCAGCAGCGGCTGTCTGTGCCG
M R P L F L E L L G N H A Q C P Y G V L L K T H C P L R A A V T P A A G V C A R

GGAGAAGCCCCAGGCTCTGTGGCGGCCCCGAGGAGGAGACAGACCCCCGCTCGCTGGTGCAGCTGCTCCGCCAGCACAGCAGCCCTGGCAGGTGTACGGCTTGTGGGGCGCTG
E K P Q G S V A A P E E E D T D P R R L V Q L L R Q H S S P W Q V Y G F V R A C

CCTGCGCGGCTGGTGGCCCCAGGCTCTGGGGCTCCAGGCACAACGAACGCCGCTTCTCAGGAACCAAGAAGTTCTCTCCTGGGAAGCATGCCAAGCTCTCGCTGCAGGAGCT
L R R L V P P G L W G S R H N E R R F L R N T K K F I S L G K H A K L S L Q E L

Fig. 11AJ



GACGTGGAAGATGAGCGTGGGACTGCGCTTGGCTGCGCAGGAGCCAGGGGTTGGCTGTGTTCCGGCCGAGAGCACCCTGCGTGAGGAGATCTGGCCAAGTTCTGCACTGGCT
T W K M S V R D C A W L R R S P G V G C V P A A E H R L R E E I L A K F L H W L

GATGAGTGTGTACGTCGTGAGCTGCTCAGGCTTTTCTTTATGTACGGAGACCAGTTTCAAAGAAGAGGCTCTTTTCTACCGAAGAGTGTCTGGAGCAAGTTGCAAGCATTGG
M S V Y V V E L L R S F F Y V T E T T F Q K N R L F F Y R K S V W S K L Q S I G

AATCAGACAGCACTTGAAGAGGTGACGTGCGGAGCTGTGGAAGCAGAGGTGAGCAGCATCGGAAGCCAGGCCCGCTGCTGACGTCCAGACTCCGCTTCATCCCAAGCCTGA
I R Q H L K R V Q L R E L S E A E V R Q H R E A R P A L L T S R L R F I P K P D

CGGGCTCGGGCCGATTGTGAACATGGACTACGTCGTGGGAGCCAGAACGTTCCGAGAGAAAAGAGGGCCGAGCGTCTCACCTCGAGGGTGAAGGCACTGTTGAGCTGTCAACTACGA
G L R P I V N M D Y V V G A R T F R R E K R A E R L T S R V K A L F S V L N Y E

GCGGGCGGGCGCCCGGCTCTGGGCGCTGTGCTGGGCTGGACGATATCCAGGGCTGGCGACCTTCGTGCTGCGTGTGGGGCCAGGACCCCGGCTGAGCTGACTT
R A R R P G L L G A S V L G L D D I H R A W R T F V L R V R A Q D P P P E L Y F

TGTCAGG
V K

GACAGGCTCAGGAGGTATCGCCAGCATCATAAACCCAGAACACGTAAGTGGTGGTGGTATGCCGTGGTCCA
D R L T E V I A S I I K P Q N T Y C V R R Y A V V Q

GAAAGCCGCCCATGGGCACGTCCGCAAGGCCCTTCAAGAGCCAGCTCTACCTTGACAGACCTCCAGCCGTACATGCCAGATTGCTGGCTCACCTGAGGAGACAGCCCGCTGAGGGA
K A A H G H V R K A F K S H V S T L T D L Q P Y M R Q F V A H L Q E T S P L R D

TGCCGTGCTCATCGAGCAGAGCTCTCCCTGAATGAGGCCAGCAGTGGCTCTTGACGCTCTCTACGCTTCATGTGCCACCAGCCGTGCCATCAGGGGCAAGTCTACGTCCAGTG
A V V I E Q S S S L N E A S S G L F D V F L R F M C H H A V R I R G K S Y V Q C

CCAGGGATCCCGAGGGCTCCATCTCTCCAGCTGCTGTGACGCTGTGCTACGGGACATGGAGAACAAGCTGTTTGGGGATTGCGGGGAGGGCTGCTCTGCGTTTGGTGA
Q G I P Q G S I L S T L L C S L C Y G D M E N K L F A G I R R D G L L L R L V D

TGATTTCTGTGTTGGTGACACCTCACCTCACCCACGCAAAACCTTCTCAGGACCTGGTCCGAGGTGTCCCTGAGTATGGCTGCGTGGTGAAGTTCGGAAGACAGTGGTGAAGTTCCTCC
D F L L V T P H L T H A K T F L R T L V R G V P E Y G C V V N L R K T V V N F P

TGTAGAAGACGAGGCCCTGGGTGGCAGGCTTTTGTTCAGATGCCGGCCACGGCTATTCCTGGTGGGCTGCTGCTGGATACCCGAGCCTGGAGGTGACAGCGACTACTCCAG
V E D E A L G G T A F V Q M P A H G L F P W C G L L L D T R T L E V Q S D Y S S

CTATGCCCGACCTCCATCAGAGCCAGTCTCACCTTCAACCGCGGCTTCAAGGCTGGGAGGAACATGCGTCGCAAACTTTTGGGGTCTTGGGCTGAAGTGTACAGCCTGTTTCTGGA
Y A R T S I R A S L T F N R G F K A G R N M R R K L F G V L R L K C H S L F L D

TTTGCAGGTGAACAGCCTCCAGACGGTGTGCACCAACATCTACAAGATCTCTGCTGACGGGTACAGGTTTACGCAATGTGTGCTGACGCTCCCATTTTCATCAGCAAGTTTGAAGAA
L Q V N S L Q T V C T N I Y K I L L L Q A Y R F H A C V L Q L P F H Q Q V W K N

CCCCACATTTTCTGCGGTCATCTCTGACAGGCTCCCTCTGCTACTCCATCTGAAAGCAAGAAGCAGGGATGTGCTGGGGCCAGGGCGCCCGGCTCTGCTCTCCGA
P T F F L R V I S D T A S L C Y S I L K A K N A G M S L G A K G A A G P L P S E

GGCGGTGACGTGGCTGTGCCACCAAGCATTCCTGCTCAAGCTGACTGACACCGTGTACCTACGTGCCACTCTGGGGTCACTCAGGACAGCCAGACGAGCTGAGTCGGAAGCTCCC
A V Q W L C H Q A F L L K L T R H R V T Y V P L L G S L R T A Q T Q L S R K L P

GGGACGACGCTGACTGCCCTGGAGGCCGAGCAACCCGGCACTGCCCTCAGACTTCAAGACCATCTGGACTGATGGCCACCCGCCACAGCCAGGCCGAGAGCAGACACAGCAGCC
G T T L T A L E A A A N P A L P S D F K T I L D

Fig. 11AK



CTGTCACGCCGGGCTCTACGTCCAGGGAGGGAGGGGCGGCCACACCCAGGCCCGCACCGCTGGGAGTCTGAGGCCTGAGTGAGTGTTGGCCGAGGCCTGCATGTCCGGCTGAAGGCT
GAGTGTCCGGCTGAGGCCTGAGCGAGTGTCCAGCCAAGGGCTGAGTGTCCAGCACACCTGCCGTCTTCACTTCCCCACAGGCTGGCGCTCGGCTCCACCCAGGGCCAGCTTTCTCTAC
CAGGAGCCCGGCTTCCACTCCCCACATAGGAATAGTCCATCCCAGATTGCCATTGTTACCCCTCGCCCTGCCCTCTTGGCTTCCACCCACCATCCAGGTGGAGCCCTGAGAA
GGACCTCGGAGCTCTGGGAATTTGGAGTGACCAAGGTGTGCCCTGTACACAGGCGAGGACCTGCACCTGGATGGGGTCCCTGTGGGTCAAATTGGGGGAGGTGCTGTGGGAGTAA
AATACTGAATATATGAGTTTTTCAGTTTTGA

Fig. 11AL



Truncated protein that lacks motif A (ver. 2)

ATGCCGCGCGCTCCCCGCTGCCGAGCCGTGCGCTCCCTGCTGCGCAGCCACTACCGCGAGGTGCTGCCGCTGGCCACGTTCTGT
M P R A P R C R A V R S L L R S H Y R E V L P L A T F V

CGGCGCTGGGGCCCCAGGGCTGGCGGCTGGTGACGCGGGGACCCGGCGGCTTCCGCGCGTGGTGGCCAGTGCCGTGGTGTGCGTGCCCTGGGACGACGCGCGCCCCCGCCG
R R L G P Q G W R L V Q R G D P A A F R A L V A Q C L V C V P W D A R P P P A A

GGCCTCCCCGGGTGCGCTCGGCTGGGGTTGAGGGCGCGGGGGGAACAGCGACATGCGGAGAGCAGCGCAGGCGACTCAGGGCGCTTCCCCCGCAGGTG
G L P G V G V R L G L R A A G G N Q R H A E S S A G D S G R F P R R
A S P G S A S G W G * G R P G G T S D M R R A A Q A T Q G A S P A G
P P R G R R P A G V E G G R G E P A T C G E Q R R R L R A L P P Q V

CCCTCCTTCGCCAGGTGTCTGCTGAAGGAGCTGGTGGCCGAGTGCTGCAGAGGCTGTGCGAGCGCGCGGGAAGAACGTGCTGGCCTTCGGCTTCGCGCTGCTGGACGGGGCCCG
P S F R Q V S C L K E L V A R V L Q R L C E R G A K N V L A F G F A L L D G A R

CGGGGGCCCCCGAGGCTTCACCACGAGCTGCGCAGCTACCTGCCCAACAGGTGACCGACGCACTGCGGGGGAGCGGGGCGTGGGGGCTGCTGCTGCGCCGCGTGGGCGACGACGT
G G P P E A F T T S V R S Y L P N T V T D A L R G S G A W G L L L R R V G D D V

GCTGGTTCACCTGCTGGCAGCTGCGCGCTCTTGTGCTGGTGGCTCCAGCTGCGCTACAGGTGTGCGGGCGCGCGTGTACCAGCTCGGCGCTGCCACTCAGGCCCGGGCCCCCGCC
L V H L L A R C A L F V L V A P S C A Y Q V C G P P L Y Q L G A A T Q A R P P P

ACACGCTAGTGACCCCGAAGGCGCTGGGATGCGAACGGGCTGGAACATAGCTCAGGGAGCGCGGGTCCCCCTGGGCTGCCAGCCCCGGGTGCGAGGAGCGCGGGGCGAGTGC
H A S G P R R R L G C E R A W N H S V R E A G V P L G L P A P G A R R R G G S A

CAGCCGAAGTCTGCCGTTGCCAAGAGGCCAGGCGTGGCGCTGCCCTGAGCCGAGCGGACGCCGTTGGGAGGGGTCTGGGCCACCCGGGCGAGGACGCGTGACCGAGTGACCG
S R S L P L P K R P R R G A A P E P E R T P V G Q G S W A H P G R T R G P S D R

TGTTTCTGTGGTGTACCTGCCAGACCCGCCGAAGAAGCCACCTCTTTGAGGGTGGCGTCTCTGGCAGCGCCACTCCACCCATCCGTGGGCGCCAGCACCACGGGGCCCCC
G F C V V S P A R P A E E A T S L E G A L S G T R H S H P S V G R Q H H A G P P

ATCCACATGCGGCCCCACAGTCCCTGGGACAGCCTGTCCCCCGGTGTACGCCGAGACCAAGCACTTCTCTACTCTCAGGCGACAAGGAGCAGCTGCGGCCCTCTTCTACTCAG
S T S R P P R P W D T P C P P V Y A E T K H F L Y S S G D K E Q L R P S F L L S

CTCTGAGGCCCAGCCTGACTGGCGCTCGGAGGCTCGTGAGACCATTTCTGGGTTCCAGGCCCTGGATGCCAGGGACTCCCGCAGGTTGCCCCGCTGCCACGCGCTACTGGCA
S L R P S L T G A R R L V E T I F L G S R P W M P G T P R R L P R L P Q R Y W Q

AATGCGGCCCTGTTCTGGAGCTGCTGGGAACACGCGCAGTGCCCTACGGGTGCTCTCAAGACGCACTGCGCGTGGGAGCTGCGGTACCCCGACGCGCGGTGTCTGTGCCCC
M R P L F L E L L G N H A Q C P Y G V L L K T H C P L R A A V T P A A G V C A R

GGAGAAGCCCCAGGCTCTGTGGCGCCCCGAGGAGGAGACAGACCCCCGTGCGCTGGTGCAGTGCTCCGCCAGCACAGCAGCCCTGGCAGGTGTACGGCTCTGTGCGGGCTG
E K P Q G S V A A P E E E D T D P R R L V Q L L R Q H S S P W Q V Y G F V R A C

CCTGCGCGGCTGGTGGCCCCAGGCTCTGGGGCTCCAGGCACAACGACCCGCTTCTCAGGAACACCAAGAAGTTCATCTCCCTGGGGAAGCATGCCAAGCTCTGCTGCAGGAGCT
L R R L V P P G L W G S R H N E R R F L R N T K K F I S L G K H A K L S L Q E L

Fig. 11AM



GACGTGGAAGATGAGCGTGGGGACTGCGCTTGGCTGCGCAGGAGCCAGGGGTTGGCTGTGTTCGGCCGAGAGCACCCTGCGTGAGGAGATCCTGGCCAAGTTCCTGCACTGGCT
T W K M S V R D C A W L R R S P G V G C V P A A E H R L R E E I L A K F L H W L

GATGAGTGTGTACGTGCTGAGCTGCTCAGGTCTTTCTTTTATGTACGGAGACCAGCTTTCAAAGAACAGGCTCTTTTCTACCGGAAGAGTGTCTGGAGCAAGTGCAGCAAGCATTGG
M S V Y V V E L L R S F F Y V T E T T F Q K N R L F F Y R K S V W S K L Q S I G

AATCAGACAGCACTTGAAGAGGGTGCAGCTGCGGGAGCTGTGGAAGCAGAGGTGAGGAGCATCGGAAGCCAGGCCCGCCCTGCTGACGTCCAGACTCCGCTTCATCCCCAAGCCTGA
I R Q H L K R V Q L R E L S E A E V R Q H R E A R P A L L T S R L R F I P K P D

CGGGTGGCGCCATTGTGAACATGGACTACGTGCTGGGAGCCAGAACGTTCCGACAGAAAAGAGGGCCGAGCGTCTCACCTCGAGGGTGAAGGCACTGTTGAGCGTCTCAACTACGA
G L R P I V N M D Y V V G A R T F R R E K R A E R L T S R V K A L F S V L N Y E

GCGGGCGCGGCCCGCCCTCTGCTGGGCGCTCTGTCTGGGCTGGACGATATCCAGAGGGCTGGCGACCTTCGTGCTGCTGCTGGGCGCCAGGACCCGCGCCTGAGCTGTACTT
R A R R P G L L G A S V L G L D D I H R A W R T F V L R V R A Q D P P P E L Y F

TGCAAG
V K

GACAGGCTCACGGAGGTGATCGCCAGCATCATAAACCCAGAACAGTACTGCGTGGTGGTATGCGGTGGTCA
D R L T E V I A S I I K P Q N T Y C V R R Y A V V Q

GAAGGCCGCCCATGGGCACGTCCGCAAGGCCTTCAAGAGCCACGTCTCTACCTTGACAGACCTCCAGCGTACATGCGACAGTTCGTGGCTCACCTGCAGGAGACCAGCCCGCTGAGGGA
K A A H G H V R K A F K S H V S T L T D L Q P Y M R Q F V A H L Q E T S P L R D

TGCGTGTGTCAGGACAGCTCCTCCTGAATGAGGCCAGTGGCTCTTCGACGTCTTCTACGCTTCATGTGCCACCAGCGGTGCGCATCAGGGGCAAGTCTACGTCCAGTG
A V V I E Q S S S L N E A S S G L F D V F L R F M C H H A V R I R G K S Y V Q C

CCAGGGGATCCCGAGGGCTCCATCCTCTCCACGTGCTCTGCAGCCTGTGCTACGGCGACATGGAGAACAAGCTGTTTGGGGGATTGCGGGGACGGGCTGCTCCTGCGTTTGGTGA
Q G I P Q G S I L S T L L C S L C Y G D M E N K L F A G I R R D G L L L R L V D

TGATTTCTGTGGTGACACCTCACCTCACCCAGCGAAACCTTCTCAGGACCTGGTCCGAGGTGTCCCTGAGTATGGTGGTGGTGAACCTGCGGAAGACAGTGGTGAACCTCCC
D F L L V T P H L T H A K T F L R T L V R G V P E Y G C V V N L R K T V V N F P

TGTAGAAGACAGGCCCTGGGTGGCACGGCTTTTGTTCAGATGCGGGCCACGGCCTATTCCCTGGTGGGCTGCTGCTGGATACCGGACCTGGAGGTGCAGAGCGACTACTCCAG
V E D E A L G G T A F V Q M P A H G L F P W C G L L L D T R T L E V Q S D Y S R

GTGAGCGCACCTGGCCGGAAGTGAGCCTGTGCCCGCTGGGGCAGGTGCTGCTGCAGGGCGTGGCTCCACCTCTGCTTCCGTGTGGGGCAGGCGACTGCCAATCCCAAGGGTCAGA
*

TGCCACAGGGTGGCCCTCGTCCATCTGGGGCTGAGCACAATGCATCTTCTGTGGAGTGAGGGTGCCTCACAACGGGAGCAGTTTTCTGTGCTATTTTGGTAA...

Fig. 11AN



Lacks motif A and altered C-terminus (ver. 2)

ATGCCGGCGCTCCCCGCTGCCGAGCCGTGCGCTCCCTGCTGCGCAGCCACTACCGGAGGTGCTGCCGCTGGCCACGTTCTGT
M P R A P R C R A V R S L L R S H Y R E V L P L A T F V

CGGCGCTGGGGCCCCAGGGCTGGCGGCTGGTGACGCGGGGACCCGGCGGCTTTCCGCGCGTGGTGGCCAGTGCCCTGGTGTGCGTGGCCTGGGACGACGCGCGCCCCCGCGC
R R L G P Q G W R L V Q R G D P A A F R A L V A Q C L V C V P W D A R P P P A A

GGCCTCCCCGGGTGCGCTCGGCTGGGTTGAGGGCGGCGGGGGGAACAGCGACATGCGGAGAGCAGCGCAGGCGACTCAGGGCGCTTCCCCCGCAGGTG
G L P G V G V R L G L R A A G G N Q R H A E S S A G D S G R F P R R
A S P G S A S G W G * G R P G G T S D M R R A A Q A T Q G A S P A G
P P R G R R P A G V E G G R G E P A T C G E Q R R R L R A L P P Q V

CCCCCTCTCCGCCAGGTGTCTGCTGAAGGAGCTGGTGGCCGAGTGCTGCAGAGGCTGTGCGAGCGCGGCGGAAGAACGTGTGGCTTCGGCTTCGCGCTGCTGGACGGGGCCCG
P S F R Q V S C L K E L V A R V L Q R L C E R G A K N V L A F G F A L L D G A R

CGGGGGCCCCCGAGGCTTCAACCAGCGTGGCGAGTACCTGCCCAACAGGTGACCGAGCGACTGCGGGGAGCGGGGCGTGGGGGCTGCTGCTGCGCGCGTGGCGACGACGT
G G P P E A F T T S V R S Y L P N T V T D A L R G S G A W G L L L R R V G D D V

GCTGGTTACCTGCTGGCAGCTGCGCGCTTTGTGCTGGTGGCTCCAGCTGCGGCTACCAAGTGTGCGGGCGCGCGTGTACAGCTGCGGCTGCCACTCAGGCCCCGGCCCCCGC
L V H L L A R C A L F V L V A P S C A Y Q V C G P P L Y Q L G A A T Q A R P P P

ACACGCTAGTGGACCCGAAGGCGTCTGGATGCGAACGGGCTGGAACCATAGCTCAGGGAGGCGGGGTCCCCCTGGGCTGCCAGCCCCGGGTGCGAGGAGGCGGGGGCAGTGC
H A S G P R R R L G C E R A W N H S V R E A G V P L G L P A P G A R R R G G S A

CAGCCGAAGTCTGCCGTTGCCAAGAGGCCAGGCGTGGCGCTGCCCTGAGCGGAGCGGACGCCGTTGGGAGGGTCTTGGGCCACCCGGGAGGACGCGTGGACGAGTGACCG
S R S L P L P K R P R R G A A P E P E R T P V G Q G S W A H P G R T R G P S D R

TGGTTTCTGTGGTGTCACTGCCAGACCCGCGAAGAAGCCACCTTTTGGAGGGTGGCTCTCTGGCAGCGCCACTCCACCCATCCGTGGGCGCCAGCACCACGCGGGCCCCC
G F C V V S P A R P A E E A T S L E G A L S G T R H S H P S V G R Q H H A G P P

ATCCACATCGCGGCCACCAGTCCCTGGGACAGCCTTGTCGCCCGGTGTACGCCGAGACCAAGCACTTCTCTACTCTCAGGCGACAAGGAGCAGTGCGGCCCTCTCTACTCAG
S T S R P P R P W D T P C P P V Y A E T K H F L Y S S G D K E Q L R P S F L L S

CTCTGTAGGCCCCAGCCTGACTGGCGCTCGGAGGCTCGTGGAGACCATTTCTGGGTTCCAGGCCCTGGATGCCAGGGACTCCCCGAGGTTGCCCCGCTGCCAGCGCTACTGGCA
S L R P S L T G A R R L V E T I F L G S R P W M P G T P R R L P R L P Q R Y W Q

AATCGGCCCCCTGTTTCTGGAGTGCTTGGGAACACGCGAGTGCCCCACGGGGTGTCTCAAGACGCACTGCCGCTGCGAGCTGCGGTACCCACAGCAGCGGTGTCTGTGCCCG
M R P L F L E L L G N H A Q C P Y G V L L K T H C P L R A A V T P A A G V C A R

GGAGAAGCCCCAGGGCTCTGTGGCGCCCCCGAGGAGGACACAGACCCCGTGGCTGGTGCAGTGTCTCGCCAGCACAGCAGCCCTGGCAGGTGTACGGCTTCTGTGGGGCTG
E K P Q G S V A A P E E E D T D P R R L V Q L L R Q H S S P W Q V Y G F V R A C

CCTGCGCGGCTGGTGGCCCCAGGCTCTGGGGCTCCAGGCACAACGACCGGCTTCTCAGGAACCAAGAAGTTCATCTCCCTGGGAAGCATGCCAAGCTCTGCTGCAGGAGCT
L R R L V P P G L W G S R H N E R R F L R N T K K F I S L G K H A K L S L Q E L

Fig. 11AO



GACGTGGAAGATGAGCGTGC GGAGCTGCGCTTGGCTGCCGAGGAGCCAGGGGTTGGCTGTGTTCGGCCGAGAGCACCGTCTGCGTGAGGAGATCTGGCCAAGTTCTGCACTGGCT
T W K M S V R D C A W L R R S P G V G C V P A A E H R L R E E I L A K F L H W L

GATGAGTGTGTACGTCGTGAGCTGCTCAGGTCTTTCTTTATGTACGGAGACCACGTTTCAAAGAACAGGCTCTTTTCTACCGGAAGAGTGTCTGGAGCAAGTTGCAAAGCATTGG
M S V Y V V E L L R S F F Y V T E T T F Q K N R L F F Y R K S V W S K L Q S I G

AATCAGACAGCACTTGAAGAGGGTGACGCTGCGGGAGCTGTGGAAGCAGAGGTGAGCAGCATCGGGAAGCCAGGCCCGCTGCTGACGTCCAGACTCCGCTTCATCCCCAAGCCTGA
I R Q H L K R V Q L R E L S E A E V R Q H R E A R P A L L T S R L R F I P K P D

CGGGCTGCGGCCATTGTGAACATGGACTACGTCGTGGGAGCCAGAACGTTCCGAGAGAAAAGAGGGCCGAGCGTCTCACCTCGAGGGTGAAAGGCACTGTTGAGCGTCTCAACTACGA
G L R P I V N M D Y V V G A R T F R R E K R A E R L T S R V K A L F S V L N Y E

GCGGGCGCGGCCCGGCTCTCTGGGCGCTCTGTGCTGGGCTGGACGATATCCAGAGGCTGGCGCACCTTCGTGCTGCGTGTGCGGGCCAGGACCCGCGGCTGAGCTGTACTT
R A R R P G L L G A S V L G L D D I H R A W R T F V L R V R A Q D P P P E L Y F

TGTCAGG
V K

GACAGGCTCACGGAGGTGTCGCCAGCATCATCAAAACCCAGAACACGTACTGCGTGGTGGTATGCCGTGGTCCA
D R L T E V I A S I I K P Q N T Y C V R R Y A V V Q

GAAGGCCGCCCATGGGCAGTCCGCAAGGCCCTCAAGAGCCAGCTCTACCTTGACAGACCTCCAGCGTACATGCGACAGTTCGTGGCTCACCTGCAGGAGACCAGCCCGCTGAGGGA
K A A H G H V R K A F K S H V S T L T D L Q P Y M R Q F V A H L Q E T S P L R D

TGCGTGTGTCAGCAGAGCTCTCCCTGAATGAGGCCAGTGGCTCTTCGACGCTCTCTACGCTTCATGTGCCACCAGCGGTGCGCATCAGGGCAAGTCTACGTCCAGTG
A V V I E Q S S S L N E A S S G L F D V F L R F M C H H A V R I R G K S Y V Q C

CCAGGGGATCCCGCAGGGCTCCATCTCTCCAGCTGCTCTGCAGCCTGTGTACGGCGACATGGAGAACAAGCTGTTTGGGGGATTGCGGGGACGGGCTGCTCTCGCTTTGGTGA
Q G I P Q G S I L S T L L C S L C Y G D M E N K L F A G I R R D G L L L R L V D

TGATTTCTGTGTGGTGACACCTCACCTCACCCAGCGAAAACCTTCTCAGGACCTGGTCCGAGGTGTCCCTGAGTATGGCTGCGTGGTGAACCTTGCAGAACAGTGGTGAACCTCCC
D F L L V T P H L T H A K T F L R T L V R G V P E Y G C V V N L R K T V V N F P

TGTAGAAGACGAGGCCCTGGGTGGCACGGCTTTTGTTCAGATGCCGGCCACGGCTATTCCCTGGTGGGCTGCTGCTGGATACCGGACCTGGAGGTGACAGCGACTACTCCAG
V E D E A L G G T A F V Q M P A H G L F P W C G L L L D T R T L E V Q S D Y S S

CTATGCCCGACCTCCATCAGAGCCAGTCTCACCTTCAACCGCGGCTTCAAGGCTGGGAGGAACATGCGTCGCAAACTCTTGGGGTCTTGGGCTGAAGTGTACAGCCTGTTTCTGGA
Y A R T S I R A S L T F N R G F K A G R N M R R K L F G V L R L K C H S L F L D

TTTGAGGTGAACAGCCTCCAGACGGTGTGCACCAACATCTACAAGATCTCTGCTGCAGGGTACAGGTTTACGCATGTGTGCTGCAGCTCCCATTTTCATCAGCAAGTTTGAAGAA
L Q V N S L Q T V C T N I Y K I L L L Q A Y R F H A C V L Q L P F H Q Q V W K N

CCCCACATTTTCTGCGCGTCATCTGTGACAGGCTCCCTCTGCTACTCCATCTGAAAGCCAAGAACGAGGGATGTCGCTGGGGGCCAAGGGCGCCCGGCTCTGCGCTCCGA
P T F F L R V I S D T A S L C Y S I L K A K N A E

CCGAAGAAAACATTTCTGTGCTGACTCTGCGGTGCTTGGGT
E E N I L V V T P A V L G S

GGGACAGCCAGAGATGGAGCCACCCGACAGCGTGGGTGTGGGAGCTTTCCGGTGTCTCTGGGAGGGGAGTTGGGCTGGGCTGTGACTCTCAGCCTCTGTTTTCCCGAG
G Q P E M E P P R R P S G V G S F P V S P G R G V G L G L *

Fig. 11AP

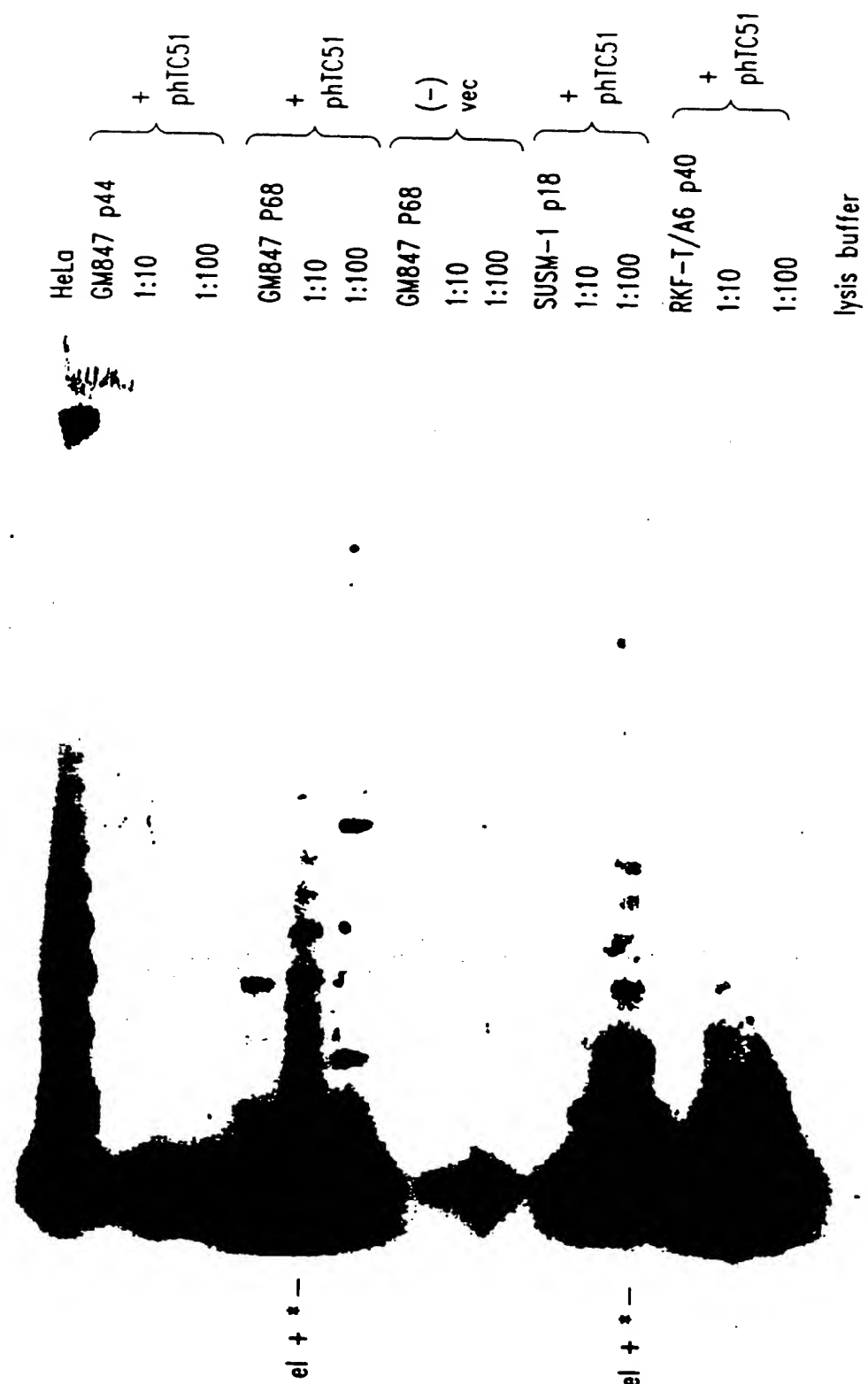


Fig. 12

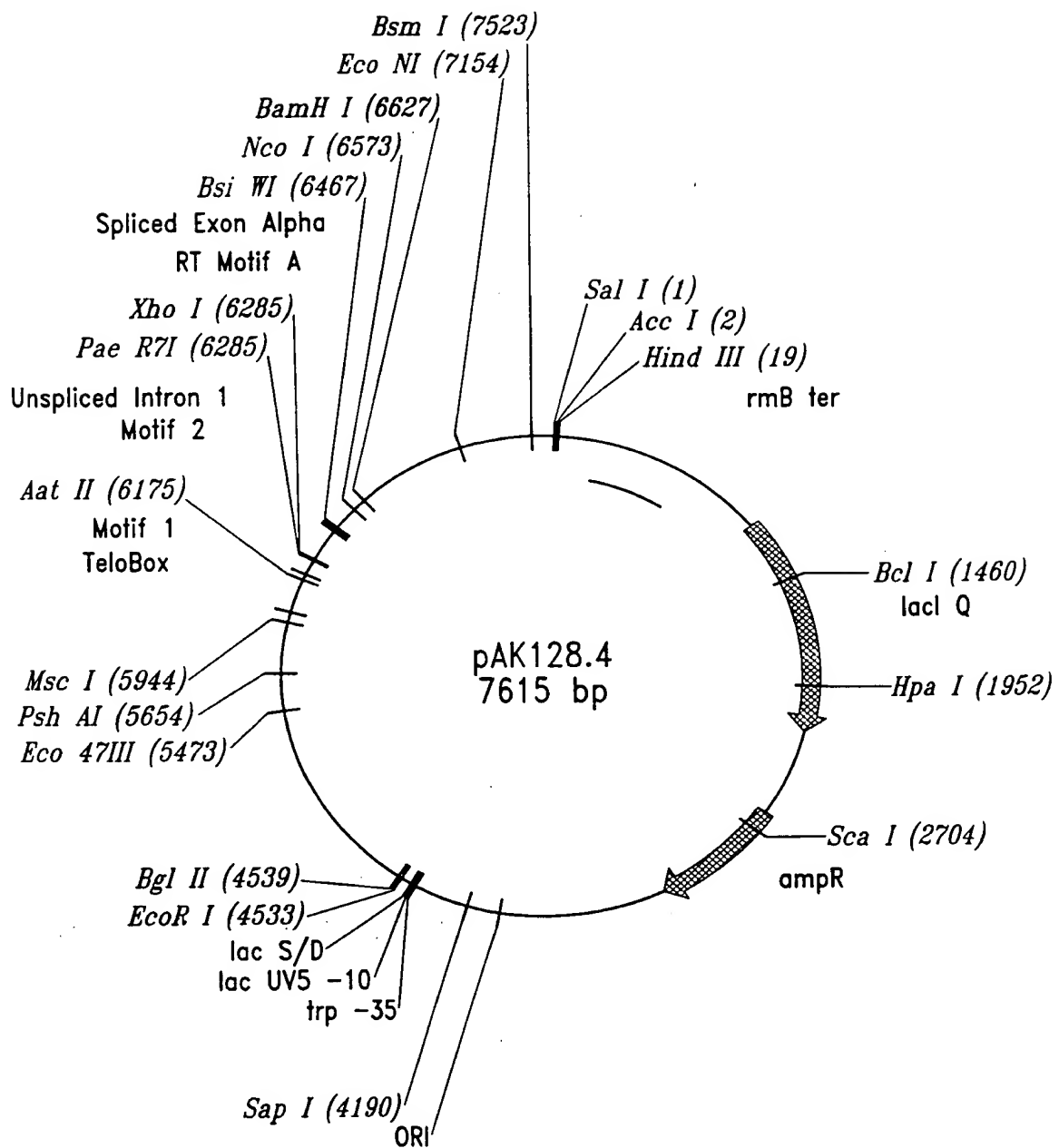


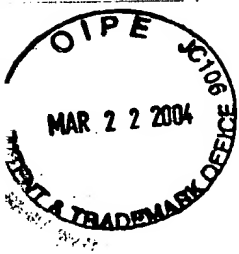
Fig. 13A



LOCUS pAKI28.4 7615 bp dsDNA Circular
DEFINITION Human telomerase clone with exon beta spliced out

```
1 tgcacctgca ggcattgcaag cttggcactg gccgtcggtt tacaacgtcg tgactgggaa
61 aaccctggcg ttaccaact taatgcctt gcagcacatc cccctttcgc cagctggcgt
121 aatagcgaag aggccgcac cgatcgccct tccaacagt tgcgcagcct gaatggcgaa
181 tggcgccatga tgcggtatit tctccttac catctgtgcg gtatttcaca ccgcataaat
241 tccctgtttt ggcggatgag agaagatttt cagcctgata cagattaaat cagaacgcag
301 aagcggctctg ataaaacaga atttgccctg cggcagtagc gcggtgggtc cacctgaccc
361 catgccgaac tcagaagtga aacgccgtag cgccgatggt agtgtggggt ctccccatgc
421 gagagtaggg aactgccagg catcaataa aacgaaaggc tcagtcgaaa gactgggcct
481 ttcgttttat ctgtgtttg tcggtgaacg ctctcctgag taggacaaat ccgccgggag
541 cggatttgaa cgttgcaag caacggcccg gaggggtggc ggcaggacgc ccgccataaa
601 ctgccaggca tcaaattaag cagaaggcca tctgacgga tggccttttt gcgtttctac
661 aaactcttcc tgtcgtcata tctacaagcc atccccccac agatacggta aactagcctc
721 gtttttgcac caggaaagca gggaatttat ggtgcactct cagtacaatc tgctctgatg
781 ccgcatagtt aagccagccc cgacaccgac caacaccgac tgacgcgccc tgacgggctt
841 gtctgtctcc ggcattccgt tacagacaag ctgtgaccgt ctccgggagc tgcattgtgc
901 agaggttttc accgtcatca ccgaaacgcg cgagacgaaa gggcctcgtg atacgcctat
961 ttttataggt taatgtcatg ataataatgg tttcttagac gtgaggttct gtaccgcaca
1021 ccatcgaatg gtgcaaaacc tttcgcggtg tggcatgata gcgcccgaa gagagtcaat
1081 tcagggtggt gaattgtgaa ccagtaacgt tatacagatg cgcagagtat gccggtgtct
1141 cttatcagac cgtttccgcg gtggtgaacc aggccagcca cgtttctgcg aaaacgcggg
1201 aaaaagtgga agcggcgatg gcggagctga attacattcc caaccgcgtg gcacaacaac
1261 tggcgggcaa acagtcgttg ctgattggcg ttgccacctc cagtctggcc ctgcacgcgc
1321 cgtcgcaaat tgtcgcggcg attaaatctc gcgccgatca actgggtgcc agcgtggtgg
1381 tgtcgatggt agaacgaagc ggcgtcgaag cctgtaaagc ggcggtgcac aatcttctcg
1441 cgcaacgcgt cagtgggctg atcattaact atccgctgga tgaccaggat gccattgctg
1501 tggaaagctgc ctgcactaat gttccggcgt tatttcttga tgtctctgac cagacacca
1561 tcaacagtat tattttctcc catgaagacg gtacgcgact gggcgtggag catctggtcg
1621 cattgggtca ccagcaaatc gcgctgttag cgggcccatt aagtctgtc tcggcgcgctc
1681 tgcgtctggc tggctggcat aaatatctca ctcgcaatca aattcagccg atagcggaac
1741 ggaagggcga ctggagtgcc atgtccggtt ttcaacaaac catgcaaatg ctgaatgagg
1801 gcacgtttcc cactgcgatg ctggttgcca acgatcagat ggcgctgggc gcaatgcgcg
1861 ccattaccga gtccgggctg cgcgttggtg cggatatctc ggtagtggga tacgacgata
1921 ccgaagacag ctcatgttat atcccgccgt taaccacat caaacaggat tttcgccctg
1981 tggggcaaac cagcgtggac cgcttgctgc aactctctca gggccaggcg gtgaagggca
2041 atcagctgtt gccgctctca ctggtgaaaa gaaaaaccac cctggcgccc aatacgcaaa
2101 ccgcctctcc ccgcgcgttg gccgattcat taatgcagct ggcacgacag gtttcccgac
2161 tggaaagcgg gcagtgcgca caacgcaatt aatgtaagt agctcactca ttaggcaccc
2221 caggctttac actttatgct tccgacctgc aagaacctca cgtcagggtg cacttttcgg
2281 ggaaatgtgc gcggaacccc tatttgttta tttttctaaa tacattcaaa tatgtatccg
2341 ctcatgagac aataaccctg ataaatgctt caataatatt gaaaaaggaa gagtatgagt
2401 attcaacatt tccgtgtcgc cttattccc ttttttgccg ctttttgcc tctgttttt
2461 gctcaccag aaacgctggt gaaagtaaaa gatgctgaag atcagttggg tgcacgagtg
2521 ggttacatcg agaactggat ctcaacagcg gtaagatcct tgagagtttt cgcgccgaag
2581 aacgttttcc aatgatgagc acttttaaag ttctgctatg tggcgcggtg ttatcccgta
2641 ttgacgccgg gcaagagcaa ctcggtcgcc gcatacacta ttctcagaat gacttggtg
```

Fig. 13B



2701 agtactcacc agtcacagaa aagcatctta cggatggcat gacagtaaga gaattatgca
2761 gtgctgccat aaccatgagt gataacactg cggccaactt acttctgaca acgatcggag
2821 gaccgaagga gctaaccgct tttttgcaca acatggggga tcatgtaact cgccttgatc
2881 gttgggaacc ggagctgaat gaagccatac caaacgacga gcgtgacacc acgatgcctg
2941 tagcaatggc aacaacgttg cgaaactat taactggcga actacttact ctgacttccc
3001 ggcaacaatt aatagactgg atggaggcgg ataaagtgc aggaccactt ctgcgctcgg
3061 cccitccggc tggttggttt attgctgata aatctggagc cggtgagcgt gggctcgcg
3121 gtatcattgc agcactggg ccagatggta agccctccg tatcgtagt atctacacga
3181 cggggagtcg ggcaactatg gatgaacgaa atagacagat cgctgagata ggtgcctcac
3241 tgattaagca ttggttaactg tcagaccaag tttactcata tatactttag attgatttaa
3301 aacttcattt ttaatttaaa aggatctagg tgaagatcct ttttgataat ctcatgacca
3361 aaatccctta acgtgagttt tcgttccact gagcgtcaga ccccgtagaa aagatcaaa
3421 gatcttcttg agatcctttt tttctgcg cgtaatctgtg cttgcaaaca aaaaaaccac
3481 cgctaccagc ggtggtttgt ttgccggatc aagagctacc aactctttt ccgaaggtaa
3541 ctggcttcag cagagcgagc ataccaaata ctgtccttct agtgtagccg tagttaggcc
3601 accacttcaa gaactctgta gcaccgcta catacctgc tctgctaate ctgttaccag
3661 tggtctgtgc cagtggcgat aagtcgtgtc ttaccgggtt ggactcaaga cgatagttac
3721 cggataaggc gcagcggtcg ggctgaacgg ggggttcgtg cacacagccc agcttgagc
3781 gaacgaccta caccgaactg agatacctac agcgtgagca ttgagaaagc gccacgcttc
3841 ccgaaggag aaaggcggac aggtatccg taagcggcag ggtcggaaac ggagagcgca
3901 cgaggagct tccaggggga aacgcctggt atctttatag tctgtcggg tttcgccacc
3961 tctgacttga gcgtcgattt ttgtgatgct cgtcagggg gcggagccta tggaaaaacg
4021 ccagcaacgc ggccttttta cggttcctgg ccttttgctg gccttttgct cacatgttct
4081 ttctgtcggt atcccctgat tctgtggata accgtattac cgcttttag tgagctgata
4141 ccgctcgccg cagccgaacg accgagcgca gcgagtcagt gagcgaggaa gcggaagagc
4201 gccaatacgc caaacgcct ctcccgcgc gttggcgat tcattaatgc agaattaatt
4261 ctcatgtttg acagcttate atcgactgca cggtgacca atgcttctg cgtcaggcag
4321 ccacggaag ctgtggtatg gctgtgcagg tcgtaaatca ctgcataatt cgtgtcgtc
4381 aaggcgact cccgttctg ataattgttt ttgcgagc atcataacg ttttgccaaa
4441 tattctgaaa tgagctgttg acaattaatc atcggctcgt ataattgtg gaattgtgag
4501 cggataacaa tttcacacag gaaacagcga tgaattcaga tctcaccatg aaggagctgg
4561 tggcccaggt gctgcagagg ctgtgcgagc gcggcgcgaa gaacgtgctg gccttcggct
4621 tcgcgtgct ggacggggcc cgcgggggccc cccccaggc cttcaccacc agcgtgcgca
4681 gctacctgcc caacacggtg accgagcac tcggggggag cggggcgctg gggctgtgc
4741 tgcgcccgt gggcgacgac gtgtgtgttc acctgtgtgc acgtgcgctg ctctttgtg
4801 tgggtggctc cagctgcgcc taccaggtgt cggggcgccc gctgtaccag ctgcgctg
4861 ccactcaggc cgggccccg ccacacgcta gtggacccc aaggcgtctg ggatgcgaac
4921 gggcctggaa ccatagcgtc agggaggccg ggggtcccc gggcctgcca gcccgggtg
4981 cgaggaggcg cgggggcagt gccagccgaa gtctgccgtt gccaagagg cccaggcgtg
5041 gcgctgccc tgagccggag cggacgccc ttgggcagg gtcctgggc caccgggca
5101 ggacgcgtg accgagtgac cgtgtttct gtgtggtgt acctgccaga cccgccgaag
5161 aagccacctc tttggagggt gcgtctctg gcacgcgcca ctcccacca tccgtgggc
5221 gccagcacca cgcgggcccc ccatccacat cgcggccacc acgtccctg gacacgcctt
5281 gtccccgggt gtacgcccag accaagcact tctctactc ctacggcgac aaggagcagc
5341 tgcggccctc ctctctactc agctctctga ggcccagcct gactggcgct cggaggctg
5401 tggagaccat ctttctgggt tccaggccct ggatgccagg gactccccgc aggttgcccc
5461 gcctgcccc gcgtacttg caaatgcggc cctgtttct ggagctgctt ggaaccacg
5521 cgcagtgcc ctacggggtg ctctcaaga cgcactgcc gctgcgagct gcggtcacc

Fig. 13C



5581 cagcagccgg tgtctgtgcc cgggagaagc cccagggctc tgtggcggcc cccgaggagg
5641 aggacacaga cccccgtgc ctggtgcagc tgctccgcca gcacagcagc ccctggcagg
5701 tgtacggctt cgtgcgggcc tgctgcgcc ggctgggtgcc cccaggcctc tggggctcca
5761 ggcacaacga acgccgttc ctcaggaaca ccaagaagt catctccctg ggggaagcatg
5821 ccaagctctc gctgcaggag ctgacgtgga agatgagcgt gcgggactgc gcttggctgc
5881 gcaggagccc aggggttggc tgtgttccgg ccgcagagca ccgtctgctg gaggagatcc
5941 tggccaagtt cctgcactgg ctgatgagtg tgtacgtcgt cgagctgctc aggtctttct
6001 tttatgtcac ggagaccacg tttcaaaaga acaggctctt tttctaccgg aagagtgtct
6061 ggagcaagtt gcaaagcatt ggaatcagac agcacttgaa gaggggtgcag ctgcccggagc
6121 tgtcgggaagc agaggtcagg cagcatcggg aagccaggcc cgccttgctg acgtccagac
6181 tccgcttcat cccaagcct gacgggctgc ggccgattgt gaacatggac tacgtcgtgg
6241 gagccagaac gttccgcaga gaaaagaggg ccgagcgtct cacctcgagg gtgaaggcac
6301 tgttcagcgt gctcaactac gagcggggcg ggcccccgg cctcctgggc gcctctgtgc
6361 tgggcctgga cgatatccac agggcctggc gcaccttctg gctgcgtgtg cggggccagg
6421 acccgccgcc tgagctgtac tttgtcaagg tggatgtgac gggcgctgac gacaccatcc
6481 cccaggacag gctcacggag gtcacgcca gcatcatcaa accccagaac acgtactgcg
6541 tgcgctcgga tgccgtggtc cagaaggccg cccatgggca cgtccgcaag gccttcaaga
6601 gccacgtcct acgtccagtg ccaggggatc ccgcagggt ccatectctc cacgtgtctc
6661 tgcagcctgt gctacggcga catggagaac aagctgtttg cggggattcg gcgggacggg
6721 ctgctcctgc gtttgggtga tgatttcttg ttggtgacac ctcacctcac ccacgcgaaa
6781 acttcctcag gacctggtcc gaagtgtcct gagtatggct gcgtggtgaa cttgcggaag
6841 acagtgggtga acttcctgt agaagacgaa gccctgggtg gcacggcttt tggtcagatg
6901 ccggcccacg gcctattccc ctggtgcggc ctgctgctgg ataccggac cctggagggtg
6961 cagagcgact actccagcta tgcccggacc tccatcagag ccagtctcac cttaaccgc
7021 ggcttcaagg ctgggaggaa catgcgtgc aaactcttg gggcttgcg gctgaagtgt
7081 cacagcctgt ttctggattt gcagggtgaac agcctccaga cgggtgtcac caacatctac
7141 aagatcctcc tgctgcaggc gtacagggtt cacgcagtgt tgctgcagct cccatttcat
7201 cagcaagttt ggaagaacct cacatttttc ctgcgcgtca tctctgacac ggctccctc
7261 tgctactcca tctgaaagc caagaacgca gccgaagaaa acatttctgt cgtgactcct
7321 gcggtgcttg ggtcgggaca gccagagatg gagccacccc gcagaccgtc ggggtgtggg
7381 agctttccgg tgtctcctgg gaggggagtt gggctgggcc tgtactcct cagcctctgt
7441 tttccccag ggatgtcgt gggggccaag ggcgcgcgg gccctctgcc ctccgaggcc
7501 gtgcagtggc tgtgccacca agcattcctg ctcaagctga ctcgacaccg tgtcacctac
7561 gtgccactcc tggggtcact caggacaggc aagtgtgggt ggaggccagt gcggg

Fig. 13D

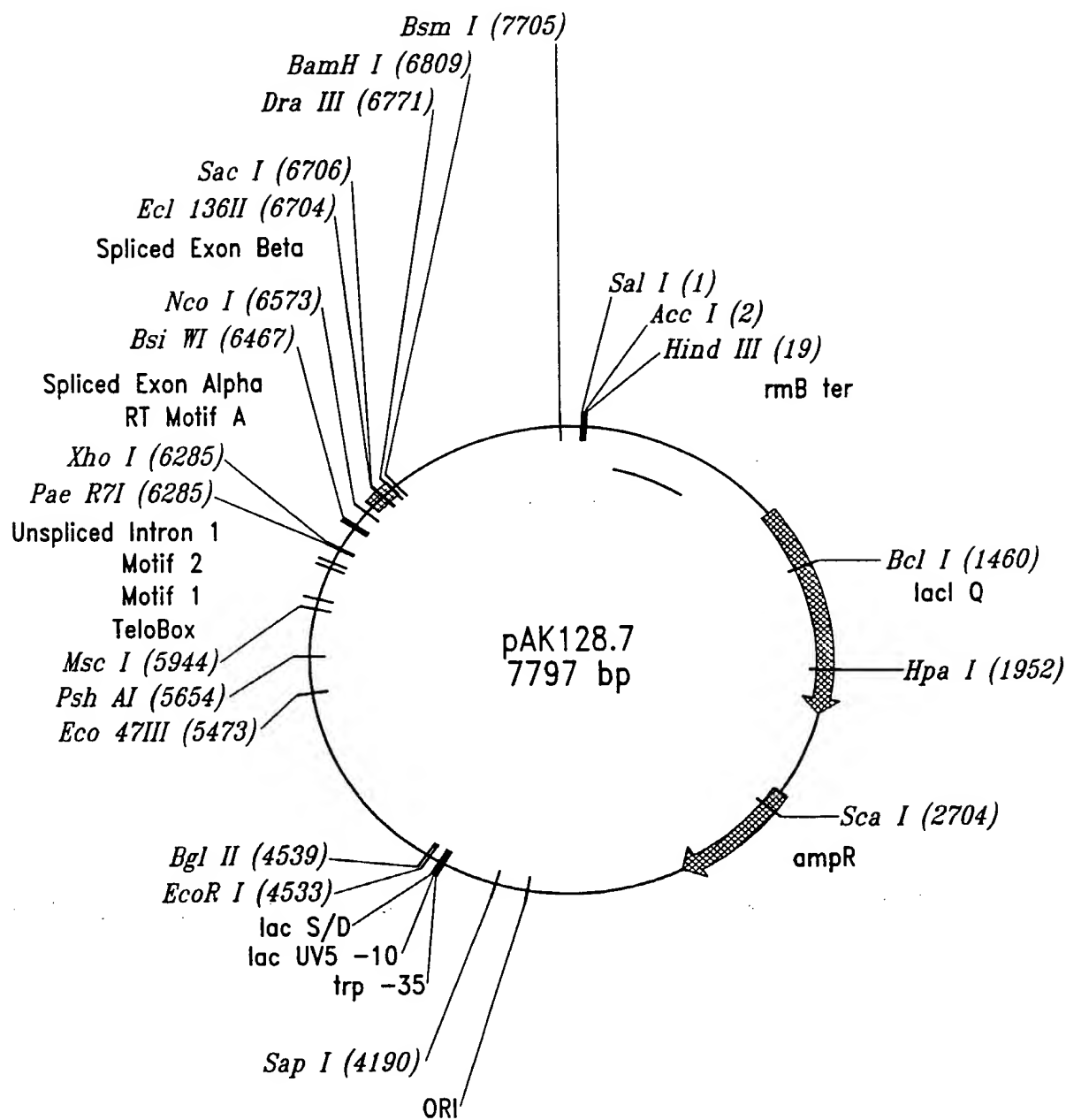


Fig. 14A



LOCUS pAKI28.7 7797 bp dsDNA Circular
DEFINITION Human telomerase clone with alternative C-terminus

```
1 tcgacctgca ggcattgcaag cttggcactg gccgtcggtt tacaacgtcg tgactgggaa
61 aaccctggcg ttacccaact taatgcctt gcagcacatc cccctttcgc cagctggcgt
121 aatagcgaag aggccgcac cgatcgccct tccaacagt tgcgcagcct gaatggcgaa
181 tggcgctga tgcggtatit tctccttacg catctgtgcg gtatttcaca ccgcataaat
241 tccctgtttt ggcggtatgag agaagatit t cagcctgata cagattaaat cagaacgcag
301 aagcggctcg ataaaacaga atttgcttg cggcagtagc gcggtggtcc cacctgacct
361 catgccgaac tcagaagtga aacgcgtag cgccgatggt agtgtgggt ctccccatgc
421 gagagtaggg aactgccagg catcaaataa aacgaaaggc tcagtcgaaa gactgggcct
481 ttcgttttat ctgtgtttg tcggtgaacg ctctctgag taggacaaat ccgcccggag
541 cggatttgaa cgttgcaag caacggcccg gaggggtggc ggccaggacgc ccgcataaa
601 ctgccaggca tcaaattaag cagaaggcca tcctgacgga tggcctttt gcgtttctac
661 aaactcttcc tgcgtcata tctacaagcc atccccccac agatacggta aactagcctc
721 gtttttgcag caggaaagca gggaatttat ggtgcactct cagtacaatc tgctctgatg
781 ccgcatagtt aagccagccc cgacaccgc caacaccgc tgacgcgcc tgacgggctt
841 gtctgtctcc ggcattccgt tacagacaag ctgtgaccgt ctccgggagc tgcattgttc
901 agaggtttcc accgtcatca ccgaaacgcg cgagacgaaa gggcctcgtg atacgcctat
961 ttttataggt taatgtcatg ataataatgg tttcttagac gtgaggttct gtaccgcaca
1021 ccattcgaatg gtgcaaaacc tttcgcggtg tggcatgata gcgcccggaa gagagtcatt
1081 tcagggtggt gaattgtgaa ccagtaacgt tatacagatg cgcagagtat gccgggtgtc
1141 cttatcagac cgtttccgc gtggtgaacc aggcagcca cgtttctgcg aaaacgcggg
1201 aaaaagtgga agcggcgatg gcggagctga attacattcc caaccgcgtg gcacaacaac
1261 tggcgggcaa acagtcgttg ctgattggcg ttgccacctc cagtctggcc ctgcacgcgc
1321 cgtcgcaaat tgcgcggcg attaaatctc gcgccgatca actgggtgcc agcgtggtgg
1381 tgcgatggt agaacgaagc ggcgtcgaag cctgtaaagc ggcgggtgcac aatcttctcg
1441 cgcaacgcgt cagtgggctg atcattaact atccgctgga tgaccaggat gccattgctg
1501 tggagctgc ctgcactaat gttccggcgt tatttcttga tgtctctgac cagacacca
1561 tcaacagtat tattttctcc catgaagacg gtacgcgact ggcgtggag catctggctg
1621 cattgggtca ccagcaaate gcgctgttag cgggccatt aagtctgtc tcggcgctc
1681 tgcgtctggc tggctggcat aaatatctca ctgcgaatca aattcagccg atagcggaac
1741 gggagggcga ctggagtgcc atgtccggtt ttcaacaaac catgcaaatg ctgaatgagg
1801 gcattcgtcc cactgcgatg ctggttgcca acgatcagat ggcgtgggc gcaatgcgcg
1861 ccattaccga gtccgggctg cgcggttggt cggaatctc ggtagtggga tacgacgata
1921 ccgaagacag ctcatgttat atcccgccgt taaccacat caaacaggat tttcgctgc
1981 tggggcaaac cagcgtggac cgcttgctgc aactctctca gggccaggcg gtgaagggca
2041 atcagctgtt gccgctctca ctggtgaaaa gaaaaaccac cctggcggcc aatagcga
2101 ccgctctcc ccgcgcttg gccgattcat taatgcagct ggcacgacag gttcccgac
2161 tggaaagcgg gcagtgaagc caacgcaatt aatgtaagt agctactca ttaggcaccc
2221 caggctttac actttatgct tccgacctgc aagaacctca cgtcaggtg cacttttcg
2281 ggaaatgtgc gcggaacccc tattgttta tttttctaaa tacattcaaa tatgtatccg
2341 ctcatgagac aataaccctg ataaatgctt caataatatt gaaaaaggaa gagtatgagt
2401 attcaacatt tccgtgtcgc ccttattccc tttttgcgg cattttgcct tctgtttt
2461 gctcaccag aaacgctggt gaaagtaaaa gatgctgaag atcagttggg tgcacgagt
2521 ggttacatcg agaactggat ctcaacagcg gtaagatcct tgagagttt cggccgaag
2581 aacgttttcc aatgatgagc acttttaag ttctgctatg tggcgcggtg ttatccgta
2641 ttgacgccgg gcaagagcaa ctcggtcgcc gcatacacta ttctcagaat gacttgggtg
```

Fig. 14B



2701 agtactcacc agtcacagaa aagcatctta cggatggcat gacagtaaga gaattatgca
2761 gtgctgccat aaccatgagt gataacactg cggccaactt acttctgaca acgatcggag
2821 gaccgaagga gctaaccgct tttttgcaca acatggggga tcatgtaact cgcttgatc
2881 gttgggaacc ggagctgaat gaagccatac caaacgacga gcgtgacacc acgatgcctg
2941 tagcaatggc aacaacgttg cgcaactat taactggcga actacttact ctgcttccc
3001 ggcaacaatt aatagactgg atggaggcgg ataaagtgc aggaccactt ctgcgctcgg
3061 cccttcggc tggctggtt attgctgata aatctggagc cggtgagcgt gggctctcgg
3121 gtatcattgc agcactgggg ccagatggta agccctcccg tatcgtagt atctacacga
3181 cggggagtca ggcaactatg gatgaacgaa atagacagat cgctgagata ggtgcctcac
3241 tgattaagca ttgtaactg tcagaccaag ttactcata tatactttag attgatttaa
3301 aacttcattt ttaattttaa aggatctagg tgaagatcct ttttgataat ctcatgacca
3361 aaatccctta acgtgagttt tcgttccact gagcgtcaga ccccgtagaa aagatcaaag
3421 gatcttcttg agatcccttt tttctgcgcg taatctgctg cttgcaaaca aaaaaaccac
3481 cgctaccagc ggtggtttgt ttgccggatc aagagctacc aactctttt ccgaaggtaa
3541 ctggcttcag cagagcgcag ataccaaata ctgtccttct agtgtagccg tagttaggcc
3601 accacttcaa gaactctgta gcaccgccta catacctcgc tctgctaate ctgttaccag
3661 tggctgctgc cagtggcgat aagtcgtgtc ttaccgggtt ggactcaaga cgatagttag
3721 cggataaggc gcagcggtcg ggctgaacgg ggggttcgtg cacacagccc agcttggagc
3781 gaacgacctc caccgaactg agatacctac agcgtgagca ttgagaaagc gccacgcttc
3841 ccgaaggagc aaaggcggac aggtatccgg taagcggcag ggtcggaaac ggagagcgca
3901 cgaggagcct tccaggggga aacgcctggt atctttatag tctgtcggg tttcggcacc
3961 tctgacttga gcgtcgattt ttgtgatgct cgtcaggggg gcggagccta tggaaaaacg
4021 ccagcaacgc ggccttttta cggttcctgg ccttttgctg gccttttgct cacatgttct
4081 ttcctgcgtt atcccctgat tctgtggata accgtattac cgcccttgag tgagctgata
4141 ccgctcggcg cagccgaacg accgagcgca gcgagtcagt gagcgaggaa gcggaagagc
4201 gcccatacgc caaacgcctc ctcccgcgc gttggccgat tcattaatgc agaattaatt
4261 ctcatgtttg acagcttata atcgactgca cgtgcacca atgcttctgg cgtcaggcag
4321 ccatcggaag ctgtggtatg gctgtgcagg tcgtaaatca ctgcataatt cgtgtcgtc
4381 aaggcgcact cccgttctgg ataattttt ttgcgccgac atcataacgg ttctggcaaa
4441 tattctgaaa tgagctgttg acaattaatc atcggctcgt ataattgttg gaattgtgag
4501 cggataacaa ttccacacag gaaacagcga tgaattcaga tctcaccatg aaggagctgg
4561 tggcccagat gctgcagagg ctgtgcgagc gcggcgcgaa gaacgtgctg gccttcggct
4621 tcgcgtgctg ggacggggcc cgcgggggccc ccccgaggc cttcaccacc agcgtgcgca
4681 gtacctgcc caacacggtg accgacgcac tgcgggggag cggggcgctg gggctgctgc
4741 tgcgcccgct gggcgacgac gtgctggttc acctgctggc acgctgcgcg ctctttgtgc
4801 tggtggtctc cagctgcgcc taccaggtgt gcgggccgcc gctgtaccag ctcggcgctg
4861 ccaactcaggc ccggcccccg ccacacgcta gtggaccccg aaggcgtctg ggatgcgaac
4921 gggcctggaa ccatagcgtc agggaggccg ggggtcccct gggcctgcca gccccgggtg
4981 cgaggaggcg cgggggcagt gccagccgaa gtctgccgtt gccaagagg cccaggcgctg
5041 gcgctgcccc tgagccggag cggacgcccg ttgggcaggg gtcttgggccc caccgggca
5101 ggacgcgtgg accgagtgac cgtggtttct gtgtggtgtc acctgccaga cccgccgaag
5161 aagccacctc ttggagggt gcgctctctg gcacgcgcca ctcccacca tccgtgggccc
5221 gccagacca cgcgggcccc ccatccacat cgcggccacc acgtccctgg gacacgcctt
5281 gtccccgggt gtacgccgag accaagcact tctctactc ctgaggcgac aaggagcagc
5341 tgcggccctc cttctactc agctctctga ggcccagcct gactggcgct cggaggctcg
5401 tggagaccat ctttctgggt tccaggccct ggatgccagg gactccccgc aggttgcccc
5461 gcctgcccc gcgctactgg caaatgcggc ccctgtttct ggagctgctt gggaaccacg
5521 cgcagtgcgc ctacggggtg ctctcaaga cgcactgcc gctgcgagct gcggtcacc

Fig. 14C



5581 cagcagccgg tgtctgtgcc cgggagaagc cccagggctc tgtggcggcc cccgaggagg
5641 aggacacaga ccccgctgc ctggtgcagc tgctccgcca gcacagcagc ccctggcagg
5701 tgtacggctt cgtgcgggcc tgcttgcgcc ggctggtgcc cccaggcctc tggggtcca
5761 ggcacaacga acgcccgttc ctcaggaaca ccaagaagtt catctccctg ggaagcatg
5821 ccaagctctc gctgcaggag ctgacgtgga agatgagcgt gcgggactgc gcttggctgc
5881 gcaggagccc aggggttggc tgtgttccgg ccgcagagca ccgtctgcgt gaggagatcc
5941 tggccaagtt cctgcactgg ctgatgagtg tgtacgtcgt cgagctgctc aggtctttct
6001 tttatgtcac ggagaccacg tttcaaaaga acaggtcttt tttctaccgg aagagtgtct
6061 ggagcaagtt gcaaagcatt ggaatcacag agcacttgaa gagggtgcag ctgcccggagc
6121 tgtcggaagc agaggtcagg cagcatcggg aagccaggcc cggcctgctg acgtccagac
6181 tccgcttcat cccaagcct gacgggctgc ggccgattgt gaacatggac tacgtcgtgg
6241 gagccagaac gttccgcaga gaaaagaggg ccgagcgtct cacctcgagg gtgaaggcac
6301 tggtcagcgt gctcaactac gagcgggcgc ggcccccgg cctcctgggc gcctctgtgc
6361 tgggcctgga cgatatccac agggcctggc gcaccttctg gctgcgtgtg cgggcccagg
6421 acccgccgcc tgagctgtac ttgtcaagg tggatgtgac gggcgctgac gacaccatcc
6481 cccaggacag gctcacggag gtcacgccca gcatcatcaa accccagaac acgtactgcg
6541 tgcgtcggtg tgccgtggtc cagaaggccg cccatgggca cgtccgcaag gcctcaaga
6601 gccacgtctc taccttgaca gacctccagc cgtacatgag acagttcgtg gctcacctgc
6661 aggagaccag cccgctgagg gatgccgtcg tcatcgagca gagctcctcc ctgaatgagg
6721 ccagcagtgg cctcttcgac gtcttccctac gcttcatgtg ccaccacgcc gtgcgcatca
6781 ggggcaagtc ctacgtccag tgccagggga tcccgagggg ctccatcctc tccacgtgc
6841 tctgcagcct gtgctacggc gacatggaga acaagctgtt tgcggggatt cggcgggacg
6901 ggctgctcct gcgtttggtg gatgatttct tgttggtgac acctcacctc acccacgca
6961 aaacttcctc aggacctggt ccgaagtgtc ctgagtatgg ctgctggtg aacttgcgga
7021 agacagtggg gaacttcctt gtagaagacg aagccctggg tggcacggct tttgttcaga
7081 tgccggccca cggcctattc ccctggtgag gcctgctgct ggatacccg accctggagg
7141 tgcagagcga ctactccagc tatgcccga cctccatcag agccagtctc acctcaacc
7201 gcggcttcaa ggctgggagg aacatgcgtc gcaaactctt tggggtcttg cggctgaagt
7261 gtcacagcct gtttctggat ttgcagggtg acagcctcca gacggtgtgc accaactct
7321 acaagatcct cctgctgcag gcgtacaggt ttcacgcag tgtgctgcag ctccatttc
7381 atcagcaagt ttggaagaac cccacatttt tctgctgct catctctgac acggcctccc
7441 tctgctactc catcctgaaa gccaaagacg cagccgaaga aaacatttct gtcgtgactc
7501 ctgcggtgct tgggtcggga cagccagaga tggagccacc ccgcagaccg tcgggtgtgg
7561 gcagctttcc ggtgtctcct gggaggggag ttgggctggg cctgtgactc ctacgctct
7621 gttttcccc agggatgtcg ctgggggcca agggcgccgc cggccctctg cctccgagg
7681 ccgtgcagtg gctgtgccac caagcattcc tgcctaagct gactcgacac cgtgtcacct
7741 acgtgccact cctggggtca ctcaggacag gcaagtgtgg gtggaggcca gtgcggg

Fig. 14D

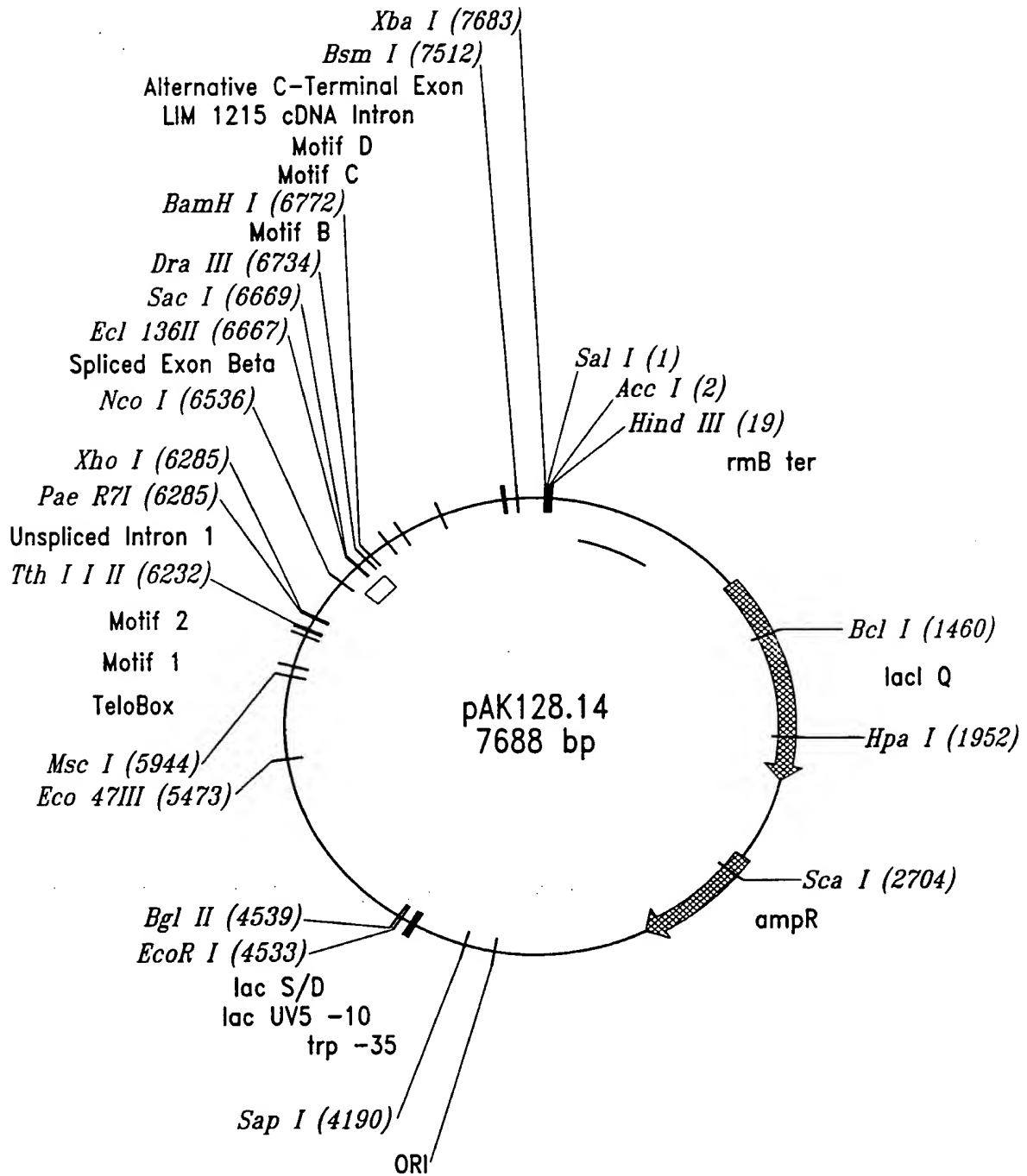


Fig. 15A



LOCUS pAKI28.14 7688 bp dsDNA Circular
DEFINITION Human telomerase clone with exon alpha spliced out

```
1 tcgacctgca ggcattgcaag cttggcactg gccgtcgttt tacaacgtcg tgactgggaa
61 aaccctggcg ttaccaact taatcgctt gcagcacatc cccctttcgc cagctggcgt
121 aatagcgaag aggccgcac cgatcgccct tccaacagt tgcgcagcct gaatggcgaa
181 tggcgctga tgcggtatct tctccttac catctgtgcg gtatttcaca ccgcataaat
241 tccctgtttt ggcggatgag agaagatttt cagcctgata cagattaaat cagaacgcag
301 aagcggctctg ataaaacaga atttgccctg cgccagtagc gcggtgggcc cactgaccc
361 catgccgaac tcagaagtga aacgccgtag cgccgatggt agtgtggggt ctcccatgc
421 gagagtaggg aactgccagg catcaataaa aacgaaaggc tcagtcgaaa gactgggcct
481 ttcgttttat ctgtgtttg tcggtgaacg ctctcctgag taggacaaat ccgccgggag
541 cggatttgaa cgttgcgaag caacggcccg gaggttgcg ggcaggacgc ccgccataaa
601 ctgccaggca tcaaattaag cagaaggcca tctgacgga tggccttttt gcgtttctac
661 aaactcttcc tgtcgtcata tctacaagcc atccccccac agatacggta aactagcctc
721 gtttttgcac caggaaagca gggaaattat ggtgcactct cagtacaatc tgctctgatg
781 ccgcatagtt aagccagccc cgacaccgc caacaccgc tgacgcgccc tgacgggctt
841 gtctgtctcc ggcattcgct tacagacaag ctgtgaccgt ctccgggagc tgcatgtgtc
901 agaggttttc accgtcatca ccgaaacgcg cgagacgaaa gggcctcgtg atacgcctat
961 ttttataggt taatgtcatg ataataatgg tttcttagac gtgaggttct gtaccgcaca
1021 ccatcgaatg gtgcaaaacc tttcgcggta tggcatgata gcgccgggaa gagagtcaat
1081 tcagggtggg gaatgtgaaa ccagtaacgt tatacgtatg cgcagagtat gccggtgtct
1141 cttatcagac cgtttcccgc gtggtgaacc aggccagcca cgtttctgcg aaaacgcggg
1201 aaaaagtgga agcggcgatg gcggagctga attacattcc caaccgcgtg gcacaacaac
1261 tggcgggcaa acagtcgttg ctgattggcg ttgccacctc cagtctggcc ctgcacgcgc
1321 cgtcgcaaat tgtcgcggcg attaaatctc gcgccgatca actgggtgcc agcgtggtgg
1381 tgtcgtatgg agaacgaagc ggcgtcgaag cctgtaaagc ggcggtgcac aatcttctcg
1441 cgcaacgcgt cagtgggctg atcattaact atccgctgga tgaccaggat gccattgctg
1501 tggaagctgc ctgcactaat gttccggcgt tatttcttga tgtctctgac cagacacca
1561 tcaacagtat tttttctcc catgaagacg gtacgcgact ggcggtggag catctggtcg
1621 cattgggtca ccagcaaatc gcgctgttag cgggccatt aagttctgtc tcggcgcgctc
1681 tgcgtctggc tggctggcat aaatatctca ctgcgaatca aattcagccg atagcggaac
1741 gggaaggcga ctggagtgcc atgtccggtt ttcaacaaac catgcaaatg ctgaatgagg
1801 gcatcgttcc cactgcgatg ctggttgcca acgatcagat ggcgctgggc gcaatgcgcg
1861 ccattaccga gtccgggctg cgcttggtg cggatatctc ggtagtggga tacgacgata
1921 ccgaagacag ctcatgttat atcccgccgt taaccacat caaacaggat tttcgctgc
1981 tggggcaaac cagcgtggac cgcttgctgc aactctctca gggccaggcg gtgaagggca
2041 atcagctgtt gcccgtctca ctggtgaaaa gaaaaaccac cctggcgccc aatacgcaaa
2101 ccgcctctcc ccgcgcgttg gccgattcat taatgcagct ggcacgacag gttcccgcac
2161 tggaaagcgg gcagtgaagc caacgcaatt aatgtaagt agctcactca ttaggcaccc
2221 caggctttac actttatgct tccgacctgc aagaacctca cgtcagggtg cacttttcgg
2281 ggaaatgtgc gcggaacccc tattgtttta tttttctaaa tacattcaaa tatgtatccg
2341 ctcatgagac aataaccctg ataaatgctt caataatatt gaaaaaggaa gagtatgagt
2401 attcaacatt tccgtgtcgc cttattccc tttttgcgg cttttgcct tcctgtttt
2461 gctcaccag aaacgctggg gaaagtaaaa gatgtgaag atcagttggg tgcacgagtg
2521 ggttacatcg agaactgat ctcaacagcg gtaagatcct tgagagtttt cggccgaag
2581 aacgttttcc aatgatgagc acttttaaa ttctgctatg tggcgcggtt ttatcccgta
2641 ttgacgccgg gcaagagcaa ctcggtcgcc gcatacacta ttctcagaat gacttggttg
```

Fig. 15B



2701 agtactcacc agtcacagaa aagcatctta cggatggcat gacagtaaga gaattatgca
2761 gtgctgccat aaccatgagt gataacactg cggccaactt acttctgaca acgatcggag
2821 gaccgaagga gctaaccgct tttttgcaca acatggggga tcatgtaact cgccttgatc
2881 gttgggaacc ggagctgaat gaagccatac caaacgacga gcgtgacacc acgatgcctg
2941 tagcaatggc aacaacgttg cgcaaaactat taactggcga actacttact cttagcttccc
3001 ggcaacaatt aatagactgg atggaggcgg ataaagtgtc aggaccactt ctgcgctcgg
3061 cccttcgggc tggctggttt attgctgata aatctggagc cggtgagcgt gggctctcgcg
3121 gtatcattgc agcactgggg ccagatggta agccctcccg tatcgtagt atctacacga
3181 cggggagtcg ggcaactatg gatgaacgaa atagacagat cgtgagata ggtgcctcac
3241 tgattaagca ttggtaactg tcagaccaag ttactcata tatactttag attgatttaa
3301 aacttcattt ttaatttaaa aggatctagg tgaagatcct ttttgataat ctcatgacca
3361 aaatccctta acgtgagttt tcgttccact gagcgtcaga ccccgtagaa aagatcaaag
3421 gatcttcttg agatcctttt tttctgcgcg taatctgctg cttgcaaaca aaaaaaccac
3481 cgctaccagc ggtggtttgt ttgccggatc aagagctacc aactctttt ccgaaggtaa
3541 ctggcttcag cagagcgcag ataccaaata ctgtccttct agtgtagccg tagttaggcc
3601 accacttcaa gaactctgta gcaccgccta catacctcgc tctgctaate ctgttaccag
3661 tggtctgtgc cagtggcgat aagtcgtgtc ttaccgggtt ggactcaaga cgatagttac
3721 cggataaggc gcagcggtcg ggctgaacgg ggggttcgtg cacacagccc agcttggagc
3781 gaacgaccta caccgaactg agatacctac agcgtgagca ttgagaaagc gccacgcttc
3841 ccgaagggag aaaggcggac aggtatccgg taagcggcag ggtcggaaaca ggagagcgca
3901 cgagggagct tccaggggga aacgcctggt atctttatag tctgtcggg tttcgccacc
3961 tctgacttga gcgtcgattt ttgtgatgct cgtcaggggg gcggagccta tggaaaaacg
4021 ccagcaacgc ggccttttta cggttccttg ccttttgctg gccttttgc ccatgttct
4081 ttcctgcgtt atccccgat tctgtggata accgtattac cgcctttgag tgagctgata
4141 ccgctcgccg cagccgaacg accgagcgca gcgagtcagt gagcgaggaa gcggaagagc
4201 gcccaatacg caaaccgcct ctccccgcgc gttggccgat tcattaatgc agaattaatt
4261 ctcatgtttg acagcttate atcgactgca cggtgacca atgttcttg cgtcaggcag
4321 ccacgcgaag ctgtggtatg gctgtgcagg tcgtaaatca ctgcataatt cgtgtcgtc
4381 aaggcgcact cccgttcttg ataattgttt ttgcgccgac atcataacgg ttctggcaaa
4441 tattctgaaa tgagctgttg acaattaatc atcggctcgt ataattgttg gaattgtgag
4501 cggataacaa tttcacacag gaaacagcga tgaattcaga tctaccatg aaggagctgg
4561 tggcccaggt gctgcagagg ctgtgcgagc gcggcgcgaa gaacgtgctg gccttcggct
4621 tcgcgtgct ggacggggcc cgcgggggccc cccccaggc cttaccacc agcgtgcgca
4681 gctacctgcc caacacggtg accgacgcac tgcgggggag cggggcgctg gggctgctgc
4741 tgcgcccgct gggcgacgac gtgctggttc acctgctggc acgtgctgcg ctctttgtgc
4801 tgggtgctcc cagctgcgcc taccagggtg gcgggcgcgc gctgtaccag ctcggcgtg
4861 cactcaggc cgggcccccg ccacacgcta gtggaccccg aaggcgtctg ggatgcgaac
4921 gggcctggaa ccatagcgtc agggaggccg ggttccccct gggcctgcca gccccgggtg
4981 cgaggaggcg cgggggcagt gccagccgaa gtctgccgtt gcccaagagg ccaggcgtg
5041 gcgtgcccc tgagccggag cggacgcccg ttgggcaggg gtcttgggccc caccgggca
5101 ggacgcgtgg accgagtgc cgtggtttct gtgtggtgtc acctgccaga cccgccgaag
5161 aagccacctc tttggagggt gcgtctctg gcacgcgcca ctcccacca tccgtgggccc
5221 gccagcacca cgcgggcccc ccatccacat cgcggccacc acgtcccttg gacacgcctt
5281 gtccccgggt gtacgccgag accaagcact tcctctactc ctacggcgac aaggagcagc
5341 tgcggccctc ctctactc agctctctga ggcccagcct gactggcgct cggaggctcg
5401 tggagaccat ctttctgggt tccaggccct ggatgccagg gactccccgc aggttgcccc
5461 gcctgcccc gcgtacttg caaatgcggc cctgtttct ggagctgctt ggaaccacg
5521 cgcagtgcc ctacgggggt ctcctcaaga cgcactgccc gctgcgagct gcggtcacc

Fig. 15C



5581 cagcagccgg tgtctgtgcc cgggagaagc cccagggctc tgtggcggcc cccgaggagg
5641 aggacacaga cccccgtcgc ctggtgcagc tgctccgcca gcacagcagc ccctggcagg
5701 tgtacggctt cgtgcgggcc tgccctgcgc ggctgggtgcc cccaggcctc tggggctcca
5761 ggcacaacga acgccgttc ctcaggaaca ccaagaagt catctccctg ggaagcatg
5821 ccaagctctc gctgcaggag ctgacgtgga agatgagcgt gcgggactgc gcttggctgc
5881 gcaggagccc aggggttggc tgtgttcgg ccgcagagca ccgtctgctg gaggagatcc
5941 tggccaagtt cctgcactgg ctgatgagtg tgtacgtcgt cgagctgctc aggtctttct
6001 tttatgtcac ggagaccacg tttcaaaaga acaggctctt tttctaccgg aagagtgtct
6061 ggagcaagtt gcaaagcatt ggaatcagac agcacttgaa gaggggtgcag ctgctgggagc
6121 tgtcgggaagc agaggtcagg cagcatcggg aagccaggcc cgccttgctg acgtccagac
6181 tccgcttcat cccaagcct gacgggctgc ggccgattgt gaacatggac tacgtcgtgg
6241 gagccagaac gttccgcaga gaaaagagg ccgagcgtct cacctcgagg gtgaaggcac
6301 tggtcagcgt gctcaactac gagcgggccc ggcccccgg cctcctgggc gcctctgtgc
6361 tgggcctgga cgatatccac agggcctggc gcaccttcgt gctgcgtgtg cgggcccagg
6421 acccgccgcc tgagctgtac tttgtcaagg acaggctcac ggaggtcatc gccagcatca
6481 tcaaaccag aacacgtact gcgtgcgtcg gtatgccgtg gtccagaagg ccgccatgg
6541 gcacgtccgc aaggccttca agagccacgt ctctacctg acagacctcc agccgtacat
6601 gcgacagttc gtggctcacc tgcaggagac cagcccgtg agggatgccg tcgtcatcga
6661 gcagagctcc tccctgaatg aggccagcag tggcctcttc gacgtcttc tacgtttcat
6721 gtgccaccac gccgtgcgca tcaggggcaa gtccctacgt cagtgccagg ggatcccga
6781 gggctccatc ctctccacgc tgctctgcag cctgtgctac ggcgacatgg agaacaagct
6841 gtttgcgggg attcggcggg acgggctgct cctgcgtttg gtggatgatt tctgttggg
6901 gacacctcac ctacccacg cgaaaacctt cctcaggacc ctggtccgag gtgtccctga
6961 gtatggctgc gtggtgaact tgcggaagac agtgggtgaac ttccctgtag aagacgaggc
7021 cctgggtggc acggcttttg ttcagatgcc ggcccacggc ctattcccct ggtgcggcct
7081 gctgctggat acccggacct tggaggtgca gagcgactac tccagctatg cccggacctc
7141 catcagagcc agtctcacct tcaaccgagg cttcaaggct gggaggaaca tgcgtcgcaa
7201 actctttggg gtcttgccgc tgaagtgtca cagcctgttt ctggatttgc aggtgaacag
7261 cctccagacg gtgtgcacca acatctacaa gatcctcctg ctgcaggcgt acaggtttca
7321 cgcagtgtgt ctgcagctcc catttcatca gcaagtgtg aagaaccca cattttcct
7381 gcgcgtcatc tctgacacgg cctccctctg ctactccatc ctgaaagcca agaacgcagg
7441 gatgtcgctg ggggccaagg gcgcgcgg ccctctgccc tccgaggccg tgcagtggct
7501 gtgccaccaa gcattctgc tcaagctgac tcgacaccgt gtcacctacg tgccactcct
7561 ggggtcactc aggacagccc agacgcagct gagtcggaag ctcccgggga cgacgtgac
7621 tgccctggag gccgcagcca acccggcact gccctcagac ttcaagacca tcctggactg
7681 atctagag

Fig. 15D